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AGRICULTURE OF VERMONT

NINTH REPORT

OF THE

COMMISSIONER OF AGRICULTURE

OF THE

STATE OF VERMONT

FOR THE BIENNIAL PERIOD

July 1, 1916, to June 30, 1918

E. S. BRIGHAM, Commissioner.



St. Albans, Vt.
St. Albans Messenger Co. Print
1918

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LETTER OF TRANSMITTAL.

**OFFICE OF DEPARTMENT OF AGRICULTURE,
STATE OF VERMONT.**

To His Excellency Horace F. Graham, Governor of Vermont:

Sir:—

I have the honor to transmit herewith the report of the Commissioner of Agriculture for the two years ending June 30, 1918, together with the report of the various societies for the promotion of agriculture.

ELBERT S. BRIGHAM,
Commissioner of Agriculture.

REPORT OF THE COMMISSIONER OF AGRICULTURE.

E. S. BRIGHAM.

No. 17 of the Acts of 1917 requires that the report of the commissioner of agriculture shall be made in each even year instead of annually as heretofore. This report, therefore, is concerned with the biennial period from July 1, 1916, to June 30, 1918. The same Act also imposed upon the Commissioner of Agriculture certain duties hitherto performed by the State Forester, the State Live Stock Commissioner and other officers. This report will be concerned with these duties from the time they were taken over by the Commissioner of Agriculture upon the date of approval of the Act above mentioned.

EFFECT OF THE WAR UPON VERMONT AGRICULTURE.

The United States became a belligerent in the European war in April, 1917. Therefore, Vermont agriculture has been conducted upon a war basis during the greater part of the period covered by this report and it is interesting to note the effect which war conditions have had upon our crop acreages and upon the production of our farms.

The following table gives the acreages of staple crops, taken from the census of 1909 and our estimates for the years 1917 and 1918:

Crop	1909 Acres	1917 Acres	1918 Acres
Wheat,	687	5,000	15,000
Oats,	71,510	88,000	100,000
Potatoes,	26,859	30,000	27,000
Barley,	10,586	17,000	18,000
Corn,	42,887	54,000	51,000
	<hr/> 152,529	<hr/> 194,000	<hr/> 211,000

The marked change has been in the acreage sown to wheat. The United States Department of Agriculture in the winter of 1918 allotted to the several states the acreages of wheat which it deemed necessary to provide an adequate supply for our country and her allies. The acreage

allotted to Vermont was 5,000. Our farmers, therefore, exceeded this allotment by 10,000 acres, or 300%. The average yield of Vermont wheat is estimated at 22 bushels per acre, which indicates a total production of 330,000 bushels. This amount of wheat will give us enough for our next spring's seeding and will manufacture 68,000 barrels of flour or about 20% of the flour needed to supply our population. The total acreage of the leading staple crops has increased 30% over the last census acreages reported.

Vermont is, however, a live stock state and a large part of the income of our farmers comes from dairy products. It is a matter of great importance to the State, therefore, to note the effect of the war upon our dairy industry. The following table shows a comparison of the listers' returns to the Secretary of State, giving numbers of live stock as of April 1, 1917, and April 1, 1918. Certain towns were missing in each year, the returns having been corrected by supplying figures for missing towns on the basis of reports submitted in other years.

LIVE STOCK CENSUS.

	Apr. 1, 1917.	Apr. 1, 1918.
Milch cows,	236,119	242,152
Other stock,	130,276	154,487
	<hr/>	<hr/>
Total neat stock,	366,395	396,639

The number of milch cows has, therefore, increased 2.5% and the number of other stock has increased 18%. Although a few of our farmers are turning to beef cattle under the stimulus of higher prices for beef, it is fair to assume that the greater part of the increase included under "other stock" is made up of young dairy heifers which will ultimately be added to our dairy herds. This showing is very encouraging, in view of the probable demand for dairy products in the next few years and the probable demand for dairy cows to replenish the herds of Europe when peace comes. Dr. Alonzo E. Taylor of the U. S. Food Administration recently stated that a country which retains its live stock will be five years ahead of the others after the war. Vermont farmers are doing their part in helping to keep the nation's position strong in this connection.

The following table shows the production of dairy products for the calendar years 1916 and 1917, as taken from

reports furnished us by milk shippers, condensaries, creameries and cheese factories:

Article.	1916.	1917.
Milk shipped, lbs.,	163,132,578	153,895,110
Price per cwt.,	\$ 1.725	\$ 2.439
Milk condensed, lbs.,	45,919,092	52,726,306
Price per cwt.,	\$ 1.695	\$ 2.482
Butterfat shipped as sweet cream, lbs.,	8,627,236	7,312,405
Price per lb. butterfat,	37.2c	49.1c
Pounds butterfat churned,	15,505,729	9,734,107
Price per lb. butterfat,	36.63c	47.3c
Milk made into cheese, lbs.,	27,000,000	24,000,000
Price per cwt.,		\$ 2.286

Assuming that the whole milk averaged to test in butterfat 3.7%, a net decrease of 7,305,800 pounds of butterfat in production in 1917 is shown, as compared with 1916. This also shows that while our farmers have increased the number of live stock, yet the total production of dairy products has materially fallen off, which may be accounted for by the unfavorable corn season of 1917, by the high prices of the grain by-products usually used in feeding dairy cows obtaining during that year and the inability in some sections to get them at any price. These figures show that our farmers are following the example of farmers in the European countries which have retained their dairy herds under war conditions, in that the ration fed is less with a consequent decreased production. There is every probability, however, that our dairy production will be restored when more feeds are available and that our dairy industry will be left intact when peace is restored.

Our maple sugar industry has assumed a new importance now that the war has produced a shortage of sugar. A census taken through the members of the Vermont Maple Sugar Makers' Association together with data collected by the listers shows that 5,500,000 maple trees were tapped in the spring of 1918. The average production of sugar per tree was 2.26 pounds or a total of 12,430,000 pounds. The Food Administration's allowance of sugar per capita was 36 pounds per year. Vermont's sugar orchards, therefore, produced nearly enough sugar to supply the needs of the State.

Every Vermonter should feel proud of the response made by our farmers to the appeal of patriotism in increasing the number of acres in tillage and in retaining their dairy herds in the face of a great shortage of agricultural labor and in the face of very discouraging conditions. It shows conclusively that the people of the farms have worked

long and untiringly to do their part in providing a supply of food in this time of food shortage.

AGRICULTURAL LABOR.

During the biennial period the agricultural department has done everything in its power to relieve the serious shortage of labor on our farms. Before our country entered the war as a belligerent, industrial plants manufacturing war materials for the allied governments had already made heavy drafts upon our farm labor supply, because of the higher wages paid workers in these industries. When we entered the war, the army draft and the increased war activities of our government further intensified this movement from the farms. During the first year of the war, the shortage was most keenly felt in the supply of extra labor needed during the haying and harvesting seasons. In order to relieve this condition, the department of agriculture advertised widely in July, 1917, in our State papers and in several papers circulating in the industrial sections of New England. An appeal was made to workers in towns and cities to come to Vermont farms to work during the harvesting season and especially to spend their vacations doing farm work.

Enrollment return postal cards were sent to all applicants and when these return postal cards were received they were forwarded to the Extension Department of the University of Vermont, which department distributed them among the several county agents of the State. The results in many cases were very gratifying but in others were disappointing. Many farmers received no reply to letters written applicants and, on the other hand, many applicants complained that they did not hear from farmers who wanted help. Several good men were secured but conditions did not seem to warrant a repetition of the experiment in 1918.

By the spring of 1918, the labor situation was more serious and regular help hired by the month more difficult to obtain. On March 1, 1918, F. H. Bickford, of Bradford, was appointed farm labor agent for the purpose of doing everything possible to provide a supply of labor. Mr. Bickford made a careful canvass of the situation, with the result that the only help which seemed available was volunteer labor from our towns and cities and also high school boys who had not had farm training. In many states, boys had been enrolled in the boys' working reserve with great success.

Conditions in Vermont, however, were somewhat different in that, with the exception of those resident in our larger towns, most boys were within a short distance of a farm and could easily obtain employment without assistance. In order to provide training for boys of the larger towns, Commissioner of Education M. B. Hillegas and the board of education established a boys' training camp at the Vail Agricultural School. No funds were available to the board of education for this purpose but, with the consent of the board of control, the agricultural department contributed \$2,000 toward the expense of this camp. About 150 boys were trained in May and June and sent out to farms. With very few exceptions, these boys have proved efficient workers and have given good satisfaction to the farmers who employed them. As a war measure, I believe it will be good policy for the State to provide sufficient funds so that a much larger number of boys can be trained next summer.

Volunteer town labor has given great satisfaction in some sections of the country, especially in the grain raising sections of the West. In some Vermont towns, splendid results have been achieved this summer and if the war continues this work needs to be extended on a much larger scale in the summer of 1919, when there bids fair to be a much greater shortage of farm labor than at present. People of our towns and cities should take this matter seriously and an appeal should be made to commercial organizations to assist in enrolling volunteers from among business, professional and working men in towns and cities who can be spared during the time when crops are being put in and when they are ready for harvest.

VERMONT FARMERS' WAR COUNCIL.

It was the desire of the Governor and the State Council of Defense that the State's assistance to its farmers should be given along lines where help was most urgently needed. A meeting of representatives of the agricultural organizations of the State and the State agricultural agencies was called by the Secretary of the State Council of Defense at Montpelier on February 19, 1918, to discuss an agricultural program for the season of 1918, and as a result the Vermont Farmers' War Council was organized, which organization consisted of the master of the State Grange, the presidents of the county Farm Bureaus, the presidents of the Dairymen's Association, the State Horticultural Association, and the Vermont Maple Sugar Makers' Asso-

ciation and the presidents of other agricultural organizations, together with the Commissioner of Education, the director of Extension Service, the director of the Vermont Experiment Station and the State Commissioner of Agriculture. Later the State food administrator was invited to become a member and the county agents have frequently met in consultation. Several meetings have been held during the year and the Department of Agriculture has endeavored to fulfil the desires of this council in expending funds for the promotion of agriculture in this emergency.

The following food program for Vermont was established by the War Council at its first meeting:

1918 PROGRAM ADOPTED BY FARM ORGANIZATIONS AND AGENCIES WITH THE PUBLIC SAFETY COMMITTEE.

"Our country is engaged in a great world war. The very principles upon which our government is founded are at stake. Food is one of the vital factors in the winning of this war and our country's need demands that every Vermont farm be worked this spring in such a way that the greatest possible amount of food be produced. This year control of land is a sacred trust which should be used so that it will contribute to the winning of the war.

"Grow on your farm the things with which you have had best success and for which you have the necessary machinery equipment. Remember, our work, however hard, and our sacrifices, however great, cannot equal the hardships and sacrifices of our boys who are fighting for us.

GREATER WHEAT ACREAGE.

"An ample supply of wheat is a necessity in war. The government forecast of the winter wheat crop promises little prospect of relief from the present wheat shortage, unless the acreage of spring wheat is greatly increased. Vermont should grow her share of this necessary spring wheat acreage.

"Spring wheat will do well in almost any part of the State on land where a crop of corn can be grown. Seed should be sown in a well prepared seed bed at the rate of one and one-half to two bushels per acre. Early sowing is important.

"On poor land, a light application of manure is desirable, but excessive applications should be avoided. An application of 400 pounds of acid phosphate per acre, sown broadcast, will make the crop larger and more certain.

KEEP UP DAIRY INDUSTRY.

"The dairy industry has long been the mainstay of Vermont agriculture and from it we have obtained 70 per cent of our agricultural income. Milk, cheese and butter are cheaper animal foods than meat and are necessities in the diet of a people in time of war, as well as in time of peace, if physical vigor be not diminished. Therefore, our dairy industry should be maintained. However, low producing cows should be culled from our dairies, because food and labor are too valuable to be expended on poor cows. Calves from our best producing cows should be saved, but the raising of scrubs is too costly in time of war.

"We need to plan wisely in order that we may provide a cheaper ration for dairy cows. The same grain which we purchased in 1909 at a cost of \$4,750,000 would cost \$9,000,000 now. This sum represents too large a proportion of our dairy income and the tonnage represented places too great a burden upon our transportation system.

"Every farmer should plan for an acreage of corn large enough to fill sufficient silo capacity so that every cow may have an abundant supply of good silage. This corn should be of a variety which will mature in this climate and the seed should be planted so that every stalk will produce a good ear. Well eared corn silage will provide the foundation for a cheap dairy ration. Soy beans planted with the corn will improve the feeding value of the silage.

SCARCITY OF SEED CORN.

"Seed corn is very scarce. If your needs are not already supplied, try to find a supply in your neighborhood or through your county agent, or write to Extension Service, University of Vermont, Burlington. Avoid late maturing southern varieties, which are not adapted to our climatic conditions. Test all seeds for germination.

"Fertilize corn with stable manure and with 400 pounds of acid phosphate. This will supplement the manure and will hasten maturity of the crop.

"Plan in seeding this spring for an abundant supply of clover hay in the future.

"Yields of beans secured last year on many farms, in spite of unfavorable weather, suggest that it is wise policy to increase our acreage of this crop.

POTATO CROP IMPORTANT.

"Our potato acreage should at least be maintained at last year's size. This is an expensive crop to grow and

land for it should be carefully selected. Study every detail of potato culture and omit no link in the chain of operations which is necessary to grow the crop and protect it from its enemies. Plan especially to spray with Bordeaux mixture to avoid a repetition of last year's losses from blight.

"If you still have thin meadows on your farm which do not promise a good crop of hay, plant corn for husking or sow oats or barley if you have time to prepare the land and get them in. Treat oats for smut and be sure that seed germinates. Eighty-six per cent of our tillable land is in hay. We should increase the crops above mentioned at the expense of our hay acreage.

MORE PORK NEEDED.

"More pork is greatly needed because it gives storable animal fat in the most concentrated form. Under present conditions it would be doubtful economy to transport grain from the West to provide the entire ration for raising hogs in Vermont. However, hogs enough should be kept to use all farm wastes. In dairy sections where cream is sold, skim milk combined with purchased or home raised grain will provide an economical ration for pig feeding.

"Poultry will consume wastes about the place not used by other animals and our flocks should be increased.

"Sheep breeders may well plan to save their ewe lambs and increase their flocks because more wool and mutton are needed.

"In order to carry out the above program, our farmers need more capital, more seed, more fertilizer, more machinery and more labor. It will be the object of the State Public Safety Committee and the State agricultural agencies to make available a larger supply of these essential things. In this work the co-operation of every public-spirited citizen is solicited, because all classes of our people are vitally concerned in securing an adequate supply of food and should assist in doing those things which are necessary to assure it."

FARMERS' MEETINGS.

In the fall of 1916, Mr. Andrew Elliott, of Galt, Ont., a veteran breeder of live stock and an institute speaker well known to Vermonsters, was engaged to act as cattle judge at our fairs and to give demonstrations in connection with his judging. During the time when Mr. Elliott was not

engaged at the fairs, he held a series of farmers' meetings in connection with the granges.

The marketing agent, the dairy manufacturing specialist, the supervisor of cow testing associations and the commissioner of agriculture have also addressed many farmers' meetings during the biennial period. In the fall of 1917, no meetings were held because of an epidemic of infantile paralysis. In the winter of 1918, a series of meetings with creameries were held, but owing to the shortage of fuel public gatherings were eliminated as much as possible and fewer meetings were held.

BULLETINS ISSUED.

The following bulletins were issued during the biennial period:

No. 26, "Skimming Whey at Vermont Cheese Factories."

No. 27, "Milk Houses for Vermont Dairy Stables."

No. 28, "Suggestions for the Improvement of Vermont Dairy Stables."

CREAMERY INSPECTORS.

H. L. Wilson was employed as inspector of creameries in the early part of the biennial period. In August, September and October, 1916, H. B. Ellenberger was employed as inspector of cheese factories and instructor in cheese making.

The legislature of 1917 increased the appropriation for the department of agriculture so that the creamery inspection law could be more adequately carried out. In the summer of 1917, the State was divided into four districts and the following inspectors were employed:

H. L. Wilson,
G. V. Roberts,
G. H. Gorman,
H. B. Ellenberger.

Arrangements were made with the University of Vermont whereby Dr. Ellenberger served the department of agriculture for six months as inspector in the cheese making district and instructor in cheese making and acted as associate professor in dairying for the University of Vermont for the remaining six months. In the winter of 1918, Dr. Ellenberger resigned to take the professorship of dairying

at the university, and H. L. Wilson resigned to go with the United States Department of Agriculture as cheese specialist. Owing to war conditions, it was very difficult to obtain competent inspectors at the salaries which we were paying, so it was deemed advisable to divide the State into three districts and employ three inspectors. Messrs. Roberts and Gorman continued as inspectors and L. M. Kinsley was appointed to fill the vacancy caused by the resignation of Mr. Wilson.

These inspectors have carried out the terms of the creamery inspection act, inspecting creameries and the product as it was delivered by patrons. When the product was found to be below a medium standard of quality as delivered, visits were made to the farms and recommendations made for such improvement as would bring the product up to a fair standard of quality.

During the winter of 1918, the creamery inspectors made a business of checking up butterfat tests at creameries, condensaries and shipping stations. A visit was made to the plant without the knowledge of the owner. Tests were made of samples of milk or cream found in the plant and the results communicated to the patron by postal card. In the case of a creamery receiving cream, an attempt was made to arrive at the plant at the regular testing period, so that the samples tested would correspond with those tested by the creamery operator. Some variations were found in tests, but the number has been small in comparison with the total number of butterfat tests made. Confidence has been established between the patron and the creamery, because the patron has felt that he was receiving fair treatment under the supervision of the State. It is now recommended that this work be continued and that the present appropriation covering the salary and expenses of at least three inspectors be continued.

MARKETING.

The work in marketing during the biennial period has been in charge of Mogens R. Tolstrup, State market agent. The Bureau of Markets of the United States Department of Agriculture has co-operated with us in the work done to the extent of paying \$1,000 annually toward the salary of Mr. Tolstrup. For a complete description of his work, reference is made to his report printed on page 20.

NEW ENGLAND FEDERAL MILK COMMISSION.

Vermont receives a considerable proportion of her agricultural revenue from her dairy herds and from the sale of market milk in Boston and adjacent cities. The marketing of this milk has been a perplexing problem for some time. In November, 1917, representatives of the New England Milk Producers' Association and representatives of the dealers met in consultation with Herbert Hoover, United States Food Administrator, and agreed to submit the question of milk price from producer to consumer to a commission to be appointed by Mr. Hoover. In December a commission was appointed, consisting of six representatives from the State of Massachusetts and one from each of the other New England States. The Commissioner of Agriculture was chosen as the representative from Vermont on this commission. The commission met in Boston in December, 1917, and was instructed to hold hearings in order to ascertain from the evidence presented the cost of producing milk and to fix its price to the producer upon the basis of cost of production plus a reasonable profit. It was also instructed to find from the evidence presented the cost of distributing milk and to fix the price to the consumer, so that the distributor would have his costs, plus a reasonable profit. The University of Vermont, the State Grange and the Vermont Dairymen's Association sent representatives to the hearing in Boston and presented evidence as to the cost of producing milk in Vermont, which was valuable to the commission in arriving at a fair cost of production. In April, 1918, the commission was confronted with the problem of handling surplus milk, because the same number of dairies required to supply a city during the period of minimum production will, of necessity, produce a surplus in the period of flush production, which surplus must be manufactured into butter, cheese or other products. The commission adopted a surplus plan which contemplated that the dealers should choose before June 1 the stations and patrons necessary to supply their business during the period of low production in the winter months and to pay for all fluid milk purchased of these patrons and sold for consumption as fluid milk the price fixed by the commission. The surplus was to be manufactured into various products without profit to the dealer and the producer was to receive whatever the manufactured products brought, less the actual cost of manufacture. A milk administrator was appointed to police the surplus plan in order that all parties would receive fair treatment. The

awards of the milk commission, including the surplus plan, seem to have worked out to the general satisfaction of the dairy industry of Vermont and little complaint has been heard regarding milk prices. It is probable that the milk commission will continue to fix prices during the period of the war.

COW TESTING ASSOCIATION.

Mr. T. H. Moran acted as assistant in charge of cow testing associations until October, 1917. At that time arrangements were entered into with the Dairy Division of the United States Department of Agriculture, whereby Mr. O. M. Camburn was appointed to take charge of cow testing associations and Mr. Moran was to serve as his assistant. The Dairy Division paid Mr. Camburn \$1,200 toward his salary and paid \$300 toward the salary of Mr. Moran and also furnished blanks and records necessary to do the work. On April 22, 1918, Mr. R. A. Elliott was appointed to take the place of Mr. Moran, who resigned.

It has been exceedingly difficult to obtain men for cow testing association work on account of the war. Many of the men engaged as testers resigned to enlist in the army and some were taken by the draft. We can expect to do no more than keep some of the best associations alive during the war period, but after the war it is hoped that this important feature of the work may be again promoted by the department of agriculture.

CERTIFICATION OF SEED POTATOES.

Certification of seed potatoes has been continued through the biennial period. In 1916 certificates were issued to 33 growers covering 109-2-3 acres. In 1917 certificates were issued to 30 growers, covering a total acreage of 123 3-8 acres.

The price received by growers of certified seed has been greatly in advance of the price for ordinary table stock. Especially has this been true in Randolph Center and in Rutland, where a sufficient acreage is grown to attract buyers. The Randolph Center Potato Growers' Association marketed several cars of Green Mountain Seed potatoes in Long Island in the fall of 1917 at \$1.40 per bushel, F. O. B. Randolph. These seed potatoes gave such good satisfaction in Long Island that a party of Long Island growers visited Vermont in July, 1918, for the purpose of looking up from 30 to 50 cars of good Green Mountain seed. In many

sections of the State we have land adapted to the production of potatoes and no industry affords a better opportunity for making profit than does the seed potato industry for men who will take the necessary pains.

INSECT SUPPRESSION.

The work of the department of agriculture in exterminating injurious insects has been concerned during the biennial period with the brown-tail moth, the gypsy moth, the San Jose scale and some insects of minor importance.

The brown-tail moth in 1913 had gained a foothold on the entire eastern border of the State, but has continued to decrease since 1914. Only one nest was found by our inspector in the winter of 1918. It gives me great pleasure to commend the work of Harold L. Bailey, who has been my assistant in insect suppression since 1913, for the very thorough and efficient work which he has done in connection with exterminating this insect. While the cold winter of 1914 undoubtedly assisted in exterminating this pest, yet the thorough work which Mr. Bailey did in nest removal and in the introduction of parasites has contributed largely to the results obtained in freeing the State from this insect which threatened at one time to do much damage. We may again, however, expect an invasion whenever the weather is right at the time of flight and the most rigid inspection should be made annually in order that the brown-tail moth be not again allowed to gain a foothold in the State. The Federal Horticultural Board has released from the brown-tail moth quarantine all towns in Vermont, which is an added testimony of the thorough work which has been done in exterminating this insect.

The gypsy moth is now probably our most serious menace. The scouts of the Federal Government last winter located egg masses in several towns along the Connecticut River. It is the policy of the Federal Government to scout for the gypsy moth along the border of the infested territory. Once it is established in Vermont, the State must assume the responsibility of control. This insect will feed upon evergreens as well as other foliage and will be a serious menace to the timber and orchard industries of Vermont if it is not controlled.

The San Jose scale has not spread beyond the infested area last reported and progress has been made in its control within the infested area.

The tent caterpillar has again disappeared, as has also the forest tent caterpillar.

For a full report of the work done in insect control, I refer you to the report of Harold L. Bailey, on page 35.

WHITE PINE BLISTER RUST.

The legislature of 1917 amended the insect control law so that measures might also be adopted in reference to injurious fungus diseases. The main reason for doing this was the threatened injury to our white pine because of the prevalence of a disease known as the white pine blister rust.

In the spring of 1917, a thorough inspection was made of plantations where the disease had already been found and also of other important pine plantations. Scouting was also done for infected currant and gooseberry bushes, which serve as a host in the life cycle of this disease. This inspection showed that the currant and gooseberry bushes throughout the State were quite generally infected and also that the native pine areas throughout the State were also quite generally infected. It seemed impossible, therefore, to check the spread of this disease but it was thought best to attempt to control it where pine areas were of sufficient value to warrant. The Bureau of Plant Industry of the United States Department of Agriculture has assisted in making plans for the control of this disease and has also contributed 50% of the cost of the work done in its eradication. It was thought best to experiment with two control areas in order that we might find out the effectiveness of control measures and the cost of control, thereby securing data which would be of use to us in determining the best policy to pursue in reference to the control of this disease in the State. A complete report of the work done will be found on page 41. I recommend that this policy be continued until it has been demonstrated more completely what are the best control measures. I also recommend that the law be changed, fixing a limit upon the value of currant bushes, because the present method of leaving the appraisal to the selectmen has resulted in an appraisal very much in excess of the value placed by horticulturists generally and in excess of what the State can afford to pay.

DEPARTMENT OF AGRICULTURE EXPENDITURES FOR BIENNIAL PERIOD ENDING JUNE 30, 1918.

Commissioner of Agriculture:

	1917.	1918.
Salary,	\$2,202.26	\$3,000.00
Travel,	413.68	307.59
Hotel,	279.35	228.20

Office Expenses:			
Rent, Janitor, Lights,	125.10	511.28	
Furniture, Office Supplies,	272.62	529.07	
Postage,	237.34	1,364.56	
Stationery,	42.64	48.10	
Printing,	239.84	796.79	
Telephone, Telegraph,	141.84	784.27	
Freight, Express, Cartage,	62.10	31.98	
Instruments, Tools,	109.89	119.14	
Clerical Force,	614.90	2,189.40	
Dairy Manufacturing Specialist:			
Expenses only,	506.33	1,049.56	
Creamery Inspectors:			
	1917.	1918.	
Salaries,	\$1,673.00	\$4,313.42	
Expenses,	2,077.62	3,737.49	
			3,751.62 8,050.91
Cow Test Associations:			
Supervisor and Assistant:			
	1917.	1918.	
Salaries,	\$ 843.00	\$ 996.69	
Expenses,	433.55	1,211.94	
			1,276.55 2,208.63
Apiary Inspectors:			
	1917.	1918.	
Salaries,	\$ 183.00	\$ 120.00	
Expenses,	177.86	125.40	
			360.86 245.40
Nursery Inspector:			
	1917.	1918.	
Salary,	\$ 112.00	\$ 61.00	
Expenses,	144.59	76.11	
			256.59 137.11
Farm Labor Agent:			
	1917.	1918.	
Salary,	\$ 105.00	\$ 670.00	
Expenses,	34.28	197.90	
			139.28 867.90
Field Agent in Marketing:			
	1917.	1918.	
Salary,	\$1,200.02	\$1,400.00	
Expenses,	1,152.81	1,035.82	
			2,352.83 2,435.82
Agricultural Education:			
Exhibits,		226.91	500.00
Institute Speakers,		364.68	95.27

Special Assistance,	99.93	550.89
Advertising,	430.38	1,068.31
Paper for Bulletins,		346.29
Miscellaneous,	17.18	33.53
Paid direct by Auditor of Accounts,	19.15	
	<hr/>	<hr/>
Totals,	\$14,563.45	\$27,500.00

REPORT OF M. R. TOLSTRUP.

STATE MARKET AGENT.

I submit herewith a brief report of my work as field agent in marketing during the biennial period ending June 30, 1918.

The marketing work may be summarized under the following heads: Organization, Investigational, Educational and Marketing.

ORGANIZATION.

Ten co-operative dairy plants have been organized and incorporated under the State law and are now in operation. They are nearly all equipped to handle the various dairy products in whatever form appears most advantageous. Four more plants are being organized. It is believed that these organizations will help the dairyman solve his problem and afford an outlet for dairy products at the highest market price under all conditions. In Windham County the creameries have been federated for the purpose of improving the general condition and efficiency of the plants.

Assistance has also been given in organizing one cattle breeders' association and information extended to committees and others connected with the organizations of farmers' exchanges, potato growers' and milk producers' associations.

INVESTIGATIONAL.

Sufficient data has been collected and is now being compiled for publication on the following subjects:

1. Marketing live stock and veal.
2. Marketing dairy products.
3. Cost of production and marketing maple products.

Other subjects have been briefly investigated, with the following results:

Rumors that the dairy stock was being depleted and that dairy products would be insufficient were current last year. The investigation proved that more heifer calves than usual were being kept on the farm and that some unprofitable milch cows were being sold for beef at good prices, a policy which should have been pursued long ago.

In the poultry line, it was found that small flocks, owing to the high price of grain and scarcity of labor, were the most profitable, because they could be largely kept on the offal from the farm.

The manufacture of milk sugar from whey was investigated and it developed that under Vermont conditions the quantity of whey produced in one place was too small for profitable conversion into milk sugar. Quantities of from ten to fifteen thousand pounds of whey, per day, for a number of years, are necessary under the present methods of manufacture to warrant the installation of essential equipment.

The wool problem was investigated and it would seem as if the farmers could obtain higher prices for their wool if it were pooled and sold collectively. Information to this effect has been sent to the county agents. In Franklin County, for example, about ten thousand pounds of wool were sold in that way for seventy cents per pound where individuals had only secured fifty to fifty-five cents.

It was found that cottage cheese could be produced to good advantage in many places and especially for local consumption, but shipments in small quantities for long distances seemed rather unprofitable, because of the perishable nature of the product.

The possibility of Montreal as a market for northern Vermont products was investigated, with the result that ordinarily the prices there are lower than in this country. This, in addition to the customs duty, makes it inadvisable to market our products there.

EDUCATIONAL.

Ninety-eight farmers' meetings, with an average attendance of seventy-eight, have been addressed. Seventy-four directors' meetings and conferences were attended and part taken in the discussion. The attendance ranged from three to seventy people.

At the Eastern States' Exposition at Springfield, Mass., two exhibits were put on displaying Vermont products,

particular attention being given to maple, horticultural and dairy products. This afforded excellent publicity for the State, inasmuch as nearly three hundred thousand people saw our products.

In conjunction with Professor Ellenberger, bulletin No. 26, "Skimming Whey in Vermont Cheese Factories," has been published.

Several articles for trade papers and agricultural journals have been published on marketing, with a view of giving publicity to and advertising the State's products.

Through personal advice and correspondence, considerable information regarding marketing conditions has been given to individuals and organizations.

MARKETING WORK.

Assistance has been given in securing markets for approximately two and one-half million pounds of butter at increased prices, ranging from one-fourth cent to two cents per pound.

Three creameries were assisted in disposing of their total output of cream at an increase in price of from one-half cent to 5 cents per pound butterfat. A number of creameries and individual farmers were referred to markets for a part of or all their products at increased prices.

Five cheese factories were helped to better markets for their entire production and others were assisted in part. The increase in price ranged from one-fourth cent to 1 cent per pound.

In addition to the above, farmers and farmers' organizations were put in touch with reliable dealers and secured higher prices for their various farm products, such as maple sugar, beans, potatoes, hay, apples, berries, honey, etc. The results reported have been favorable. In several instances we have had call for carloads of apples, potatoes, beans and maple products which could not be supplied. Through the aid of the Bureau of Markets, telegraphic reports regarding market conditions have been secured and made available to the farmers during the potato and maple sugar making seasons. A list of reliable dealers has been compiled and distributed.

Assistance has been given to a number of parties by showing them how to proceed in the matter of collecting outstanding and bad accounts. \$2,000 has been recovered in this way. Owing to the scarcity of butter in the fall, we have been able to persuade some of the store keepers to store in the neighborhood of 200,000 pounds of butter

during the surplus season and use same during the short period. This has helped to stabilize the market and return higher rate per pound to the creamery.

We have been able to get about 20 creameries to install U. S. Bureau of Markets accounting system. An expert accountant has been detailed by the Bureau to install the system free of charge. The value of this work to the creamery is unquestioned.

Recent developments have proven the necessity of correct weights, particularly due to the high price of produce, and also shown the stringency of the Weights and Measures law. Two years ago we realized that this was coming and have, therefore, been very anxious to see that more accurate and sensitive scales were installed in the creameries. These scales are more expensive but, besides avoiding the danger of infringing the law, they also are an economic investment.

Any defects in the quality of the products as they arrive on the market, have been reported to the parties concerned so that difficulties might be remedied.

CONCLUSIONS.

Generally speaking, the markets for Vermont products are good. However, in order to keep pace with the times and be in position to meet the ever increasing competition from the West, it is well to bear in mind that pasteurization of the various dairy products is one of the vital factors in the future success of the dairy industry. It insures more uniformity and greater keeping quality of the dairy products.

Suitable advertising and publicity are two other factors which might well be used to a greater degree than at present.

REPORT OF DAIRY MANUFACTURING SPECIALIST.

V. R. JONES.

The creamery extension work in Vermont has been continued since 1916 through the assistance of a dairy manufacturing specialist furnished by the United States Department of Agriculture, Dairy Division, co-operating with the State Department of Agriculture and the University of Vermont Extension Service. The work in dairy manufacturing has been conducted under the co-operative agreement plan between the creameries and State Department of Agriculture, which was adopted in 1916. In this agreement the creameries consent to follow the suggestions and instructions given by the dairy manufacturing specialist for the improvement of methods in creamery operation. The refusal by the creamery directors to fulfill this agreement is deemed just grounds for cancellation. Since June, 1917, the number of plants which have signed the cooperative agreement for assistance in dairy manufacturing has increased from 13 to 34.

During the past year, (June 1917 to July 1918) eight co-operative creamery associations were assisted in organizing; three of these associations equipped their plants for manufacture of butter only; five were equipped to handle and market both milk and cream in addition to the manufacture of butter and cheese.

Seventeen creameries have installed the Government system of creamery accounting. All of these are in operation and giving complete satisfaction where the system is followed according to its plan. Special assistance was given by the Dairy Division and Bureau of Markets, United States Department of Agriculture, in supervising and installing this system of accounting. From the manufacturing point of view, a good system of keeping daily records of the manufacturing and handling processes of dairy products is of chief importance. If daily records are not kept of each step in the creamery operation, namely, the actual amount of butterfat purchased and the total amount of butterfat sold in form of butter, sweet cream, milk, cheese, etc., it is impossible to determine in which particular step of the operation loss of fat occurs.

AVERAGE PERCENTAGE OF OVERRUN LOW.

The average percentage of overrun in the manufacture of butter in Vermont is lower than it should be in efficiently operated creameries. The overrun in 1915 was 18.40 per cent, and in 1916 it was 18.96. For 1917, reports are not completed giving the exact number pounds of butter manufactured, but for comparison in table of statistics the overrun was estimated at 20 per cent. In 1916 there were 18,451,818 pounds of butter made from 15,505,729 pounds of butterfat, representing 19 per cent overrun. If the Vermont creameries had received 22 per cent overrun, the increase in number of pounds of butter made from the above number pounds of butterfat would represent a value of approximately \$200,000.

Following are a few examples of effect of increase in overrun where assistance has been given with this problem:

Creamery.	For Period of	Increase Overrun %	Value
Mt. Mansfield Cooperative,	1 year	20.7 to 21.1	\$ 572.83
Windham County Cooperative,	1 month	19.33 to 22.2	84.65
Lamoille Valley,	6 months	21.12 to 22.89	4,106.00

The overrun was increased at the above creameries, as well as at others, by correcting methods of testing, reducing excessive losses of fat in buttermilk and skim milk, installing accurate scales, keeping daily records, and making moisture tests of butter from each churning to control the moisture content.

QUALITY OF DAIRY PRODUCTS SHOWS IMPROVEMENT.

It has been found that at a number of creameries where the quality of milk and cream has improved that the farmers received in return from 2½ to 5 cents more per pound butterfat. The effect of the work done by the creamery inspectors in the creamery inspection of sanitary methods, in testing samples of milk and cream for per cent acidity, sediment, and temperature, and the inspection of the farms from which poor quality of cream had been received, has been no doubt the chief factor in improving the quality of dairy products the past year. The grading of milk and cream as recommended by the dairy manufacturing specialist has also been a factor in improving quality of dairy products at certain plants. At creameries where grading of milk and cream has been adopted, the acid test is used to determine the quality, no premium being paid if the per

cent of acid exceeds two-tenths. As a result of grading milk and cream, one creamery was able to increase the quantity of good quality cream from 10 to 90 per cent. At the Mt. Mansfield co-operative creamery, from June, 1917, to May, 1918, a premium was paid to the patrons of $2\frac{1}{2}$ cents per pound fat for sweet cream on 53,938.8 pounds of fat, amounting to \$1,348.49. The Richmond Farmers', Franklin County, Shelburne, and Grand Isle Co-operative Creameries, and other plants, pay a difference of five cents premium for sweet cream.

PASTEURIZATION AND USE OF STARTER IMPROVE QUALITY OF BUTTER.

Several of the creameries were assisted with pasteurization of cream and use of a commercial starter for ripening cream to improve the quality of butter. At the Monthly Educational Butter Scoring, which has continued through the year, under the direction of the Extension Service, co-operating with the State Department of Agriculture, it was found that pasteurization of cream and ripening with a starter improved the quality of butter from two to three points and increased its market value from 1 to 2 cents per pound. Several creameries are now using this method in manufacture of butter. The open vat system is rapidly being replaced by vat pasteurization method.

BUTTERFAT PAID FOR IN MILK AND CREAM INCORRECTLY DETERMINED AT MANY OF THE PLANTS.

It is estimated from the creamery inspectors' reports and from personal observation that about seventy-five per cent of the creameries and milk shipping stations in Vermont are not paying for the actual amount of butterfat received, due chiefly to composite testing of cream and averaging tests incorrectly. By investigation it was found that among ten creameries, located in various parts of the State, the amount of butterfat, either overpaid or underpaid to patrons, varied from 5 to 340 pounds of fat for a period of one month. Some of the large, as well as the small factories, pay the farmer on an average test for milk and cream, figured on number of tests made and total amount of product delivered, rather than for the actual number pounds of fat received for each delivery or period. The practice of taking and carrying a composite sample of milk, and testing once a week, every ten days, or twice a month, has proven sufficiently accurate, but the amount of fat delivered

in milk should be figured for each period from the number pounds milk received and test for that period. In this connection, I would strongly recommend the adoption of a law, requiring the testing and the determining of the amount of fat of each delivery of cream to the factory, and further, if a composite sample is taken of milk, that the total butter-fat be figured for each composite period, using the test for that period.

Assistance in dairy manufacturing has also been given to the creameries in remodeling plants, building creamery refrigerators, in improving sanitary conditions, purchasing of supplies, installing equipment, employment and supervision of help, improving the quality of dairy products, creamery accounting and daily records, advising methods of delivery of milk and cream and in efficiency in the operation of machinery, and manufacture of dairy products. An investigation was made by bacteriological analysis of milk to determine the cause for high bacteria count in milk shipped to Boston. It was found that the high count was due largely to unclean milk cans returned from Boston and generally speaking not to the conditions of handling milk on the farm.

Thirty-one creamery patrons' meetings with an average attendance of sixty-five, were conducted during the winter months. At these meetings the farmers were addressed on subjects pertaining to the improvement of quality, methods of handling and marketing dairy products.

The creamery extension work has increased threefold during the past year with the creameries operating under the co-operative agreement plan. The work has grown to such an extent that it will be necessary to secure the services of an assistant to give the creameries the proper attention.

REPORT OF H. B. ELLENBERGER.**INSTRUCTOR IN CHEESE MAKING.**

I have the pleasure of submitting the following report of my work with the cheese producing interests of the State.

At present there are only about twenty-five cheese factories in operation, several having closed temporarily to ship whole milk. The following table sets forth the volume of business done by those factories whose principal line is the manufacture of cheddar cheese. The value of the cheese sold has more than doubled within the last four years and it will be noted that there has been a steady increase both in pounds of cheese made and in the selling price with each of these years with the exception that there was a little more cheese made in 1916 than in 1917.

Year.	Lbs. Milk Made into Cheese.	Lbs. of Cheese Made.	Value of Cheese Sold.
1913	17,167,581	1,736,884	\$257,146.52
1914	20,204,701	2,054,497	306,843.02
1915	22,701,735	2,290,621	323,278.19
1916	24,477,280	2,469,615	427,068.49
1917	22,474,937	2,216,304	519,038.09

This does not represent all the cheese manufactured within the State for several market milk companies have made some hundreds of thousands of pounds of cheddar cheese from their surplus milk and various creameries have made considerable quantities of various Italian and Greek types of cheese. Other creameries and milk plants have made large quantities of cottage,—as well as cream, pimento and neufchatel cheeses.

My duties have been twofold; since I have done much educational work as well as inspection.

INSPECTION.

Each factory has been inspected at intervals as prescribed by law and many farms which were delivering milk of poor quality have been visited and inspected. Wherever needed, recommendations have been made for improvements, new equipment, change in method, etc. A number of

factories have recently put in cement floors, new whey tanks, better drainage systems and new equipment.

EDUCATIONAL.

In each case where inspection revealed improper conditions or surroundings or faulty quality of milk or cheese an effort was made to help remedy such condition through explanation, advice and demonstration. Assistance was also given in answer to a large number of special requests for aid in various factory and manufacturing problems.

Special work has been done in an endeavor to get the factories to separate the whey in order to recover the butterfat lost during the process of cheese making. A bulletin on whey skimming has been prepared jointly with M. R. Tolstrup, Field Agent in Marketing. Several meetings have been held and many visits to farms and factories have been made in the interest of conserving this fat, most of which was formerly wasted. Previous to last year practically no whey was separated in this State. During 1917 three factories which separated their whey during only a portion of the season recovered butterfat equivalent to more than 9,300 pounds of butter which netted the milk producers over \$2,000. This year seven factories are separating their whey and whereas only 3,000,000 pounds were separated last year it is safe to estimate that nearly 9,000,000 pounds will be separated during the present season and this means a saving to the farmer of five to ten cents per hundred pounds of milk.

Other lines of work have had to do with methods of paying for milk and the improvement of cheese quality. Six factories have been persuaded to change from pooling to the fat test as a method of payment for milk and at least six others have installed curd mills as an aid in the manufacture of closer bodied, firmer textured cheese.

REPORT OF O. M. CAMBURN.**IN CHARGE OF COW TESTING ASSOCIATIONS.**

The following report of the Cow Testing Association situation in Vermont covers the period from October 15, 1917, to June 30, 1918.

A steady growth in the number of associations was noticeable until the declaration of war. Shortly after that time some of the testers enlisted and many others went in the draft. A few testers asked for and received deferred classification, due to the need of encouraging increased production and the conserving of feed stuffs.

From May 1, 1917, to September 1, 1917, fourteen associations became inactive, which left twenty-two operating on November 1, 1917, since which time eight others have discontinued the work. Four new associations have been organized since December 1, 1917, which leaves eighteen active at the present time. (July 1, 1918.)

The field in general is not in the best of condition, due to the limited amount of supervision which has been given the work in the past, and to the many changes of testers which have occurred. The unrest which is noticeable in many lines of business due to the unusual conditions of the present time, is also very evident among the farmers, many of whom are dropping cow testing association work "in order to save somewhere."

Due to the advancing prices of commercial feed stuffs, many herds received no supplementary feeds while on pasture and went into the winter in lower condition than usual. Much of the ensilage was of poor quality, which, together with a shortage of grain feeds, caused a somewhat decreased production of milk from that of previous years. This, together with the uneasiness of the milk market, has caused the sale of some herds. The greater returns from the sale of whole milk encouraged many dairymen, formerly cream producers, to sell all of their milk, which in turn decreased the number of calves raised. The sale of cattle generally has been that of the lower producing cows.

Much of the alfalfa in the northern part of the State was injured by the severe winter. The hay crop is light and the corn crop has been held back by the cold weather.

TESTERS.

The securing of men to do the testing has been a problem. At the winter short course at the University two days were spent with the men in special cow testing association work. They were taken to the University farm and instructed in taking samples of milk night and morning and in testing these samples. The data secured was then worked up on the regular forms used for association work. A large association book was used in making out an annual summary of an entire association, in which the whole class assisted. From these short course students two testers were secured and are now in charge of associations.

Two visits were made to the Vermont School of Agriculture to discuss the importance of cow testing association work with the senior students. From this class five men are now in charge of associations. Three men have been secured from outside the State to take charge of associations.

Of the eighteen active associations at this time, thirteen are in charge of new men who have been started since November 1, 1917. Three of the other five men are in charge for the second year and the remaining two have been with their respective associations for several years.

A report of Cow Testing Associations for Vermont shows 47 associations as being active July 1, 1917. The following tables show the standing of those associations at that time:

When the writer took charge of cow testing association work in Vermont (October 15, 1917) there were twenty-two associations active, as listed below the line in Table A. The eight associations marked * have dropped the work and become inactive since October 15, 1917, while Table C lists four new associations organized. There are now eighteen active associations in the State.

Active October 15, 1917.....	22
Became inactive	8
New Associations	4
Active June 17, 1918.....	18

TABLE A.—COW TESTING ASSOCIATIONS.
Active July 1, 1917.

1. Grand Isle, organized,	Became Inactive.
2. Richmond,	Never had a tester
3. First Addison,	June 1, 1917
	July 1, 1917

4.	Fort Dummerston,	July 1, 1917
5.	Richford,	July 1, 1917
6.	Barnet,	Aug. 1, 1917
7.	Blue Mountain,	Aug. 1, 1917
8.	Green Mountain,	Aug. 1, 1917
9.	Bennington County,	Sept. 1, 1917
10.	Mirror Lake,	Sept. 1, 1917
11.	Tunbridge Valley,	Sept. 1, 1917
12.	Rochester,	*Nov. 1, 1917
13.	Springfield-Chester,	*Dec. 1, 1917
14.	Winooski Valley,	*Dec. 1, 1917
15.	Cabot,	*Dec. 1, 1917
16.	Stowe-Waterbury,	*Mar. 1, 1918
17.	Mad River Valley,	*Mar. 1, 1918
18.	St. Johnsbury,	*Mar. 1, 1918
19.	St. Albans, (North),	*May 1, 1918
20.	Benson, Active,	June 17, 1918
21.	Champlain Valley, Active,	June 17, 1918
22.	Charlotte, Active,	June 17, 1918
23.	Craftsbury, Active,	June 17, 1918
24.	Enosburg, Active,	June 17, 1918
25.	First Chittenden, (North), Active,	June 17, 1918
26.	First Chittenden, (South), Active,	June 17, 1918
27.	No. Randolph, Active,	June 17, 1918
28.	Lamoille Valley, Active,	June 17, 1918
29.	Orwell, Active,	June 17, 1918
30.	Rutland, Active,	June 17, 1918
31.	St. Albans, Active,	June 17, 1918
32.	Trout River, Active,	June 17, 1918
33.	White River, Active,	June 17, 1918

TABLE B—COW TESTING ASSOCIATIONS.

Inactive July 1, 1917.

		Became Inactive
1.	Derby,	1915
2.	Danville,	1916
3.	Missisquoi,	1916
4.	Burke,	} Operating together, 1916
5.	Sheffield,	
6.	Ascutneyville,	} Operating together, May 1, 1917
7.	Woodstock,	
8.	Cambridge,	May 1, 1917
9.	Lamoille County,	May 1, 1917
10.	Ira-Tinmouth-Middletown,	May 1, 1917
11.	Newbury-Piermont,	New Hampshire C. T. A.
12.	Glover,	Part of Craftsbury
13.	Waterford,	Part of St. Johnsbury
14.	Peacham,	Part of Barnet

TABLE C—COW TESTING ASSOCIATIONS.
Organized Since October 15, 1917.

1. First Addison,	Dec. 1, 1917
2. Lamoille County,	May 22, 1918
3. Washington County,	May 24, 1918
4. Derby,	June 17, 1918

1918 VERMONT COW TESTING ASSOCIATIONS.

Association.	Year Ended.	No. of Herds Finishing Year.	No. of Cow Years.	No. of Cows Sold.	No. of Days Organizing.	No. of Days with Tester.	Meetings.
Benson,	Nov. 1, 1917	22	385	36	6	3	1
Cabot,*	Dec. 1, 1917	25	427	116	2	1	1
Champlain Valley,	Mar. 1, 1918	33	628	72	4	2	1
Charlotte,	May 1, 1918	19	456	64	10	3	1
Craftsbury,	Dec. 31, 1917	18	325	61	6	4	1
Enosburg,	July 1, 1918	21	485	62	4	6	1
Chittenden, (So.)	Mar. 1, 1918	No report			9	3	1
Chittenden, (No.)	Mar. 1, 1918	20	430	57	14	9	1
Mad River Valley,*	Mar. 1, 1918	26	434	53		4	
No. Randolph,	May 1, 1918	No report			5	2	1
Orwell,	June 1, 1918	22	385	36	8	6	1
Rochester,*	Nov. 1, 1917	26	285	78		4	
Rutland,	May 1, 1918	20	675	73	4	5	
Stowe-Waterbury	Mar. 1, 1918	24	483	58	2	3	
St. Albans, (No.)*	May 1, 1918	17	418	71	5	2	1
St. Albans, (So.)	May 1, 1918	18	429	64	5	2	1
St. Johnsbury,*	Apr. 1, 1918	No report			1	1	
Trout River,	Nov. 1, 1917	17	367	7	10	6	2
White River,	Mar. 1, 1918	11	277	52		2	
Lamoille Valley,	Dec. 1, 1917	17	439	54	3	2	2
East Montpelier,**					2	6	2
Springfield-Chester,**					8	3	
First Addison, New Association,					7	5	2
Derby, New Association,					9	2	1
Washington, New Association,					7	2	1
Lamoille County, New Association,					7	2	1
Totals,		356	7328	1014	138	90	23

*Finished year then stopped.

**Did not complete year.

THE PRECEDING TABLE SHOWS

- 20 Associations completing a 12 month record.
- 17 Associations completing and reporting year's work.
- 356 Herds completing and reporting year's work.
- 1014 Cows marked sold (unprofitable cows not so indicated.)
- 7238 Cow years represented.
- 138 Days used on organization work.
- 18 Associations now active requiring 131 days to organize.
- 90 Days spent with testers on 26 Associations.
- 16 Herds having cows on advance registry—only a part of A. R. herds.
- 23 Meetings held.

The marked decrease in the number of Cow Testing Associations in this State is due very largely to the difficulty of securing competent men to take charge of these associations and also to a lack of interest in some sections. However, an interest for association work can probably be stimulated at four or five places in as many counties, provided the right kind of testers are available. At the present time, no doubt, there are young men who have had the necessary training who are working with the crops and who may be available after the harvest season, at which time additional associations can be organized.

Since November 1, 1917, a very large part of the work has been that of organization and the securing and starting of testers. Some supervision work has been done with noticeable results, but a great amount of this work is needed as the field is not in the best of condition. The records could be increased in value by the securing of complete data regarding each cow on test and by more carefully prepared yearly summaries. In a few places the officers of the associations fail to co-operate with the county agents. In other localities, the officers and directors have felt no responsibility in keeping the large association book. In order to strengthen the work and make it more uniform, a memorandum of agreement between the Farm Bureau, the officers of the Association and the Supervisor in Charge could be drawn up with profit to all parties.

Another phase of the work which would be of great value to members of some of the cow testing associations would be the encouragement of replacing grade bulls with pure bred bulls from good producing dams.

In a few cases, the testers have been publishing in the local papers a monthly report of the best producing cows

in their respective associations. However, very little of this information has gotten into the dairy papers. This matter has been taken up with all of the testers and gradually the reports are beginning to come in. This material has been placed in the hands of the dairy press and a few articles of interest have appeared in their columns. The testers have been encouraged to send items of dairy news to the dairy papers and some of these have also been published. This plan could profitably be developed into a monthly cow testing association report for the entire State and sent to each association member. Such a plan has never been developed in this State but undoubtedly it would interest the members in the State-wide work.

REPORT OF HAROLD L. BAILEY.

IN CHARGE OF INSECT SUPPRESSION.

Herewith I respectfully submit report of my work as Assistant in Charge of Insect Suppression and Fungus Disease Eradication for the two-year period, July 1, 1916, to July 1, 1918: Details concerning life history, habits, etc., of the principal insect pests mentioned herein have been included in previous reports, and, therefore, are omitted now.

BROWN-TAIL MOTH WORK.

The brown-tail moth has continued to decrease in this State through the past two years until the species is now practically absent. During the winter of 1916-17 I scouted throughout all the territory in which I believed there was likelihood of finding winter nests. I found but two areas in which there seemed to be a sufficient infestation to warrant complete inspection and nest removal. One of these sections comprised Bradford, Fairlee and the greater part of Newbury; the other consisted of Vernon and adjacent parts of Brattleboro and Guilford. These sections, with one assistant for about three weeks, I covered thoroughly in nest removal. In other towns bordering the Connecticut river from Ryegate to the Massachusetts line I found a very slight scattering infection, averaging three or four in a town, requiring about an equal number of days' scouting in each. The situation followed the

general lines of that of the previous year as described and commented upon in my report of 1916, page 26. The total number of nests found in the state was 243.

I made flight inspections throughout the lighted towns and especially at the railway junctions along the eastern border during July of 1916, but felt that the situation did not call for it in 1917.

During the past winter I made inspection trips throughout the territory previously infested by brown-tail moths, spending several days in all those parts which I considered most liable to infestation. I found but one nest. This was in Putney.

The cause of the great decrease in brown-tails here and in the whole of Northern New England is believed to be a combination of agencies including the work of nest removal, the introduced parasites and the particularly cold winters, especially that of 1914. This climatic condition appeared at exactly the right time to cut off a sufficiently high percentage of the insects so that the hand measures combined with the work of the parasites were enabled to gain control.

THE GYPSY MOTH.

Unfortunately the gypsy moth has not suffered the same decline in numbers as has the brown-tail. It has continued slowly to spread and the scouting parties of the federal government last winter located egg masses at Vernon, Rockingham, Windsor, Hartford, Norwich, Thetford, Fairlee and Bradford. Examination proved that those in Bradford and Vernon were infertile, but in Norwich the infestation attained the serious proportions of a hundred egg masses. In the other towns the numbers ran from two or three up to six.

The U. S. Bureau of Entomology continued to attend to the necessary scouting work for gypsy moths along the eastern edge of the State. Should the spread of the insect continue, however, the State will be called upon to cope with it in those towns where it has become established, and it is probable that certain auxiliary work will need to be carried on by Vermont this next winter and spring.

One of the infestations in Hartford consisted of fifteen egg masses in the village of White River Junction. It was finally found that this colony originated from an egg mass on a piano case which had been shipped from infested territory. This is significant of what may be brought to light at any time in other parts of the State.

In certain parts of New Hampshire where the gypsy moth was first discovered in small numbers five or six years ago whole areas of woodland have been stripped of foliage, the larvae feeding upon not only the hardwoods but likewise upon white, red and pitch pine, larch, spruce, fir and hemlock.

FEDERAL QUARANTINE.

Based upon the report of our investigations the Federal Horticultural Board has released from the brown-tail moth quarantine all towns in Vermont. Fairlee, Thetford, Norwich, Hartford, Windsor and Rockingham have been placed within the territory quarantined on account of the gypsy moth.

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CO-OPERATION WITH U. S. BUREAU OF ENTOMOLOGY.

In continuation of an experiment to determine the effect of atmospheric and climatic conditions upon the brown-tail moth larvae in winter nests I have exposed and regularly sent nests to the laboratory of the U. S. Bureau of Entomology at Melrose, Mass.

During the summer of 1916 I attended to the inspection and combing out of tanglefoot bands about the gypsy moth infestation in Fairlee and that in Bradford.

I have made numerous collections of various kinds of native insects at points designated by the U. S. Bureau of Entomology for experimental use in the parasitic work.

SAN JOSE SCALE.

I have scouted through the territory surrounding the known infestations of San Jose scale, and have been constantly upon the watch for new outbreaks. I have not discovered any increase of the pest, and in most cases the situation shows improvement since my last report. At Brattleboro I am confident that our policy of inspection and personal instruction of owners has shown results. A great deal of spraying has been done and a large amount of worthless fruit trees have been cut or pulled out. Although less concerted effort has been made in the village of Westminster the principal orchardists in the town have taken the matter of spraying well in hand. In several of the smaller infestations I could find but few traces of the scale. Continued care will completely eradicate it. In this connection I would say that the oyster shell scale still seems to be thriv-

ing and in many instances is doing considerable damage. An application of lime-sulphur, or a substitute material, at least once in two years will do much to alleviate this condition and will act as a safeguard against any possible infestation of San Jose scale working into the orchard.

OTHER IMPORTED INSECTS.

Of the other insects which we have considered in the more dangerous and threatening class I need speak but briefly.

The elm leaf beetle continues to do considerable damage to the street elms in the southern part of the State, but has not spread appreciably. During the summer of 1916 I assisted the tree warden of Windsor in some spraying operations directed against this insect.

No evidence of the presence of the leopard moth has yet been found in the State.

The ermine moths which I mentioned at length in my report of 1914 have not appeared in the State, nor have the pine shoot moth or the hag moth, two newly imported pests, been discovered within our borders.

An insect to be carefully guarded against is the so-called corn stalk borer, a new comer in eastern Massachusetts which is doing much damage. The larvae bores in the upper part of the stalk, and in the case of later varieties cuts off the staminate flower prematurely.

NATIVE INSECTS.

The tent caterpillar, from its great numbers and millions of tents on apple and wild cherry trees a few seasons ago, has been reduced by disease and insect parasitism to a standing approximating that of the brown-tail moth. I failed to discover a single tent this spring, and there were but very few indeed of the egg masses to be found during the winter.

There has been practically no infestation by the forest tent caterpillar, and during the past spring few bad cases of canker worm damage appeared. I noticed a considerable amount of elm stripping in parts of Addison County.

The late summer of 1917 was marked by a great abundance of three late feeding species of caterpillars, the red humped apple tree caterpillar, (*Schizura concinna*), the yellow necked caterpillar (*Datana ministra*) and the hickory tussock caterpillar (*Halisidota caryae*). These are native to the country, and though many apple trees were

stripped last season they will probably be soon controlled by natural agencies and their damage is not great owing to the lateness of the season at which they feed.

There have been but very few grasshoppers and the white grubs and rose chafers have been perhaps the worst destroyers of truck and cereal crops.

EDUCATIONAL WORK.

In the line of educational work I have spent a considerable amount of time in making insect exhibition cases for use in the schools which teach agriculture. These cases are so made that when opened one half contains nine 5x5 Riker mounts in which are specimens of the complete life history or essential stages of various insect pests. All contain mounts of the gypsy moth, the brown-tail moth, the tent caterpillar, San Jose and oyster shell scale. Others, used in various combinations, are the elm leaf beetle, the white pine weevil, the tussock moths, etc. In the cover, or opposite half of the case, is framed typewritten data concerning the specimens.

This has required the collecting of specimens in the summer, largely incidental to other work and, in some cases, rearing certain species in order to get all stages. The preparing and mounting has been done principally at such times as field work was impracticable.

Besides cases for my own use and for the main office I have supplied them to the following institutions:

State Agricultural School at Lyndon Center, State Agricultural School at Randolph, Junior High Schools at Hinesburg, Concord, Bradford, Essex Center, Plainfield, North Troy, Burlington, Cabot, Highgate Center, Proctor, Jeffersonville, Waitsfield, Swanton, North Craftsbury, Vergennes, Barton, Saxton's River, and Springfield, also, office of the Board of Trade and County Agent at Brattleboro and the Home Project Club at Lyndon. These are sent out as indefinite loans. I believe that they will prove of much value in spreading information as to insect control.

I have also completed the furnishing of libraries in each town of the State with life history mounts of the gypsy moth. In this work I prepared and distributed over two hundred mounts.

I wrote a four page circular (Cir. No. 2 Vt. Dept. Agri.) entitled "Hunting Insects In Winter." This was especially for use of school children, but was also designed to assist any tree owners. Insect eggs and nests most likely to be found on trees in winter were pictured and described, and

a form of score card was included. This was published late in the winter and copies were distributed to school superintendents, teachers and others about the state.

For illustrating the circular, lantern slides and other educational purposes I photographed insect specimens and work. I made a partial set of slides for lecture purposes.

During the fall of 1916 I was present with the insect exhibition at fairs or expositions at the following points: Springfield, St. Johnsbury, White River Junction, Northfield, St. Albans and Burlington.

I have given talks on insect control at various places about the State.

CONCLUSION.

The past two years have been favorable to agriculture from the viewpoint of insect attack. As above pointed out, not only have some of the most destructive native pests been at a low ebb in their importance, but one of the most dangerous of the imported species, the brown-tail moth, is practically eliminated for the time being from our State. We must not, however, abate our vigil against the recurrence of the old pests and the invasion of new. For they will come as surely as harvest follows seed time unless close watch is kept and every effort made to control them upon first appearance. We shall find ourselves unless precaution is taken in full worse condition than we have been at times previous. Not alone will the native insects in time swing back to a period of great abundance and the dangerous imported species keep gaining upon us, but since probably a fourth of the apple trees of the State were killed by the last winter there will be a greater concentration of pests upon those trees which are left and whose value has, at the same time, been enhanced.

FINANCIAL STATEMENT.

Salary, July 1, 1916, to May 1, 1917, at \$110,	\$1,100.00
Salary, May 1, 1917 to July 1, 1918, at \$150,	2,100.00
Educational material,	328.04
Assistants in white pine blister work,	4,034.77
Compensation for currants and gooseberries,	99.15
Expenses, hotel, car-fare, livery, postage, etc.,	1,200.60
	<hr/>
	\$8,862.56

WHITE PINE BLISTER RUST CONTROL.

During the Spring of 1917 measures for the control of White Pine Blister Rust were instituted along the same general line as previously had been carried out. Five men were employed for scouting work. All trees in those plantations where the disease had been found or where infection was thought likely were inspected. This work began June first and ended July fourteenth, during which time about 250,000 trees were looked over and pine infections found at the following places:—Lyndon, Brookfield, Sharon, Woodstock, Hartland, Rutland, Weathersfield, Springfield and Brattleboro. Scouting for infection upon currants and gooseberries was done by one man along the New York line and by two men along the section of the New Hampshire line from Woodstock to Lyndon. Ribes inspections were also made by Mr. Bailey at various points of the State. Towns in which this scouting revealed ribes infection, besides those above given as also having pine infection, were: Enosburg, Georgia, St. Johnsbury, Barnet, Ryegate, Newbury, Bradford, New Haven, Fairlee, Strafford, Norwich and Fair Haven.

After the completion of plantation scouting, work of currant and gooseberry eradication was started around those points where fruiting of the disease had been found on pine. The purpose of this eradication was:

- 1st. To prevent the spread of the rust from infected points to out-lying country. Although the fungus cannot spread from pine to pine, it can go readily, during the Summer from one ribi (currant or gooseberry) to another;

- 2nd. To protect the pine in the immediate vicinity from reinfection. In fact it was felt at that time that there still was a possibility of exterminating the pest.

Developments shortly occurred, however, which changed the outlook upon the situation and the plan of action. It was found that the disease was appearing on ribes simultaneously and early in the season at practically all points along the Connecticut Valley.

This pointed almost conclusively to a general scattering of pine infection throughout the same territory and forced the conclusion that the native pines throughout the State were infected. A serious outbreak of infection in native pine was also located at South Royalton, several miles from any known diseased plantation. These two discoveries, supported by like evidence in several other states, seemed to prove that any work toward stopping the spread was useless and that only where pine was plentiful enough to be of un-

questioned value would it pay to attempt control. Also difficulty arose in some instances in the matter of destroying cultivated ribes in conformance with the law, and in one case so high a valuation was set by the selectmen upon condemned bushes as to make continuance of the work at that point impracticable.

It was at length decided best to establish two control areas for the purpose of experimentation and demonstration. One was laid out in Thetford and Fairlee, as a typical tract of our pine country, which is confined to the larger valleys of the State, the other area consisted of the Downer State Forest in Sharon. It was planned there to protect the large State plantations and at the same time to demonstrate the feasibility of protective measures for plantations in general.

Three crews of men, each consisting of five or six laborers and a foreman, were employed for about two months and a half at Thetford and one smaller crew at Sharon. The Thetford area was mapped to show all types of land and growth upon it in order that figures might be obtained as to cost of work under the varying conditions. The Sharon area was mapped after the work had been completed so that such data will be obtainable at the close of this season's work. At Thetford the cost of ribes removal for the whole area of about seven square miles was 62c per acre and deducting tillage land the figure was increased to 78c per acre. There were very few cultivated ribes in either area, but an average of about six wild gooseberries per acre were found.

Smaller areas worked on the original plan of protection were at Royalton, Woodstock and Lyndon.

The work was all carried on co-operatively with the U. S. Bureau of Plant Industry on a dollar for dollar basis. A sufficient number of employees were kept upon the U. S. pay roll to balance the expenditures of Vermont.

Owing to shortage of labor it was thought best this Spring not to take up new territory but simply to send crews again over the two areas previously laid out. They were to have been worked over anyway, for it is held to be necessary to cover the ground four times for satisfactory results. Three, and a part of the time four, crews of from four to seven men and their foreman worked at Thetford from the first of May to the end of June. One crew is working at Sharon.

The work at both places will be completed much earlier than last year which is advantageous because the great growth of vegetation hides the ribes late in the season.

Best results are obtained in May, but the labor market cannot provide a sufficiently large force to complete the work in one month.

No plantation inspection was made this Spring but new ribes infections were found in Brandon, Sudbury, Addison, Charlotte, Essex and Jericho, showing that the disease is practically omnipresent throughout the State. A considerable infection of native pine was found at Bradford.

The expenses of the blister rust eradication work may be outlined as follows:—

Portion of salary and expenses of H. L. Bailey	
chargeable to White Pine Blister Rust acct.,	\$1,444.94
Paid assistants in White Pine Blister Rust for	
scouting,	4,034.77
Educational material, posters, lantern, etc.,	234.95
Compensation for currants and gooseberries,	99.15
Total,	<u>\$5,813.81</u>

An equal amount has been expended on work in this State during the same period by the U. S. Dept. of Agriculture, Bureau of Plant Industry.

REPORT OF DEPUTY STATE NURSERY INSPECTOR.

M. B. CUMMINGS, BURLINGTON, VT.

All the nurseries in the State have been inspected within the past twelve months. No serious disease or insect pest has been discovered in any of them. Some minor pests, which might have become seriously injurious, have been detected in incipency and the necessary control measures were adopted. A few cases of crown gall on apple trees; a little blister rust on currants; a few specimens of raspberry root gall; and some fall web worms were among the cases that needed early attention.

In general the nurseries in Vermont are remarkably clean and healthy, and every effort has been made to keep them so. A complete list of the Vermont nurserymen is given below.

The duties of the Inspector of Nurseries were considerably enlarged because the Revised Laws of 1912 imposed such work as would properly devolve upon him, in view of the operation of the Federal Plant Quarantine Law. In actual practice this means the inspection of all imported ornamental and fruit plant stock at the point of destination. The Inspector is notified by the Government, and the importing wholesaler of shipments, and upon arrival of the stock it is carefully examined.

A considerable number of letters, demanding immediate attention, come to the office of the Nursery Inspector. Some of these are from the U. S. Government, and some from State officers, all relating to the distribution of pests, the quarantine areas, or the operation and execution of the laws.

At present U. S. Postal regulations prohibit the parceling of ornamental nursery stock or small fruit plants except as they are accompanied by certificate of inspection. Individuals, who are not familiar with mail and express regulations, relating to nursery stock, often make consignments in violation of rules. Occasionally a consignment passes the postal clerks undetected, but most of the miscellaneous packages of this sort come directly to the Inspector before permitting further despatchment through the mails.

LIST OF VERMONT NURSERYMEN.

H. J. Ball, West Derby, nurseryman and florist, apple trees and small fruit plants, general retail florist stock.

George Howse, Beebe, Quebec, American nurseryman with special reference to apples. (One nursery in Vermont.)

John Wilson, Burlington, florist, ornamental shrubbery.

E. E. Gove, Burlington, strawberries, flowers and hot-bed stock and ornamentals.

H. M. Totman, Randolph, ornamental and floriculture stock of all kinds.

F. H. Horsford, Charlotte, fruit stock, ornamental shrubbery and bulbous plants.

F. H. McFarland, Waterville, tree and small fruit stock.

George H. Odell, Brattleboro, nursery fruit stock of all kinds.

C. E. Allen, Brattleboro, greenhouse plants and ornamental shrubbery.

George H. Mass, Woodstock, flowers, potted plants and ornamental shrubbery.

Luther Putnam, Cambridge, orchardist and nurseryman.

G. E. Hunt, Rutland, general florist, some shrubbery.

Baker Seed House, Rutland, ornamental stock, flowers, seeds and bulbs.

Arthur Dings, South Royalton, fruit nurseryman.

E. G. Hunt, Middlebury, florist, some shrubs.

G. A. Chedel, Randolph, forest seedlings.

C. E. Knapp, North Bennington, ornamental nurseryman.

A. H. Hill, Isle La Motte, fruit trees.

State Forest Nurseries, at Burlington and Sharon.

REPORT OF J. E. CRANE.**APIARY INSPECTOR.**

During the two years from July 1, 1916, to June 30, 1918, I have made 166 visits to various apiaries in Addison and Rutland counties. Some of these apiaries have been visited three or more times to get the owners interested and stimulated to clean up their yards and to give such information as would prove helpful.

The number of colonies found diseased and those destroyed, or their combs removed, to prevent the spread of disease, will be found in the table below. I have refrained from destroying colonies except in extreme cases where the owners were unwilling to do anything to check disease or not disposed to give them necessary care.

Number of Visits to Apiaries in several towns in Addison and Rutland Counties from July 1, 1916, to June 30, 1918.		No. colonies found diseased	No. colonies found destroyed or combs removed.
Rutland,	12	27	0
Castleton,	18	32	0
West Rutland,	5	0	10
Poultney,	2	2	0
Middletown Springs,	5	7	2
Wells,	1	0	0
Pawlet,	5	4	0
Cuttingsville,	4	5	2
Ira,	6	6	0
Clarendon,	5	11	1
Ferrisburg,	15	17	7
Hubbardton,	1	0	0
Wallingford,	25	61	5
Proctor,	2	0	0
Vergennes,	4	5	0
Pittsford,	3	0	0
Whiting,	13	50	0
Orwell,	5	15	0
Fair Haven,	3	75	0
West Haven,	4	86	0
Middlebury,	6	86	0
Tinmouth,	2	11	7
Leicester,	12	66	10
Benson,	2	10	0
Brandon,	5	16	0
Shoreham,	1	1	0
Total,	166	593	44

While the law gives an inspector the right to destroy every colony not cured of disease in twenty-one days, it has seemed to me very unwise to enforce this method of treatment, as yards of bees so treated are quite liable to take on the disease again at an early date and go under. The method of treatment now recommended by the Agricultural Department at Washington is the same that I have been advocating for European foul brood, viz., to dequeen and introduce a good train of Italian queens and keep the colonies strong. Those who are working along this line are meeting with success without the loss of combs or bees, Italian bees being much more resistant to disease than black bees.

It is greatly to be regretted that there is so little interest in beekeeping among farmers, as I believe there is no branch of rural industry that will pay better at the present time than beekeeping if intelligently followed. Last year Addison County shipped to market three or four carloads of honey. The crop will not be quite as large this year but will bring considerably more money. The demand for honey this year is greater than ever before and we cannot begin to supply it. Much more honey has gone ungathered for lack of bees and intelligent beekeepers in western Vermont than has been gathered.

It would be helpful if, in our agricultural meetings, the subject of beekeeping were made more prominent, and practical beekeepers called on to interest those present in securing a part of what is now going to waste.

My expense to the State for two years as inspector of apiaries has been

Salary,	\$199.00
Expenses,	141.00
Total,	<hr/> \$ 340.00

REPORT OF F. L. STEARNS.**APIARY INSPECTOR.**

Number of Visits to Apiaries in Several Towns in Bennington and Rutland Counties from July 1, 1916, to June 30, 1918.		No. of Diseased Apiaries Found	No. of Colonies Treated	No. Colonies Destroyed
Bennington,	29	7	12	0
Pownal,	12	0	0	0
Shaftsbury,	15	2	2	1
Manchester,	9	1	2	0
Sunderland,	2	2	0	4
Rupert,	1	0	0	0
Dorset,	10	6	29	12
Pawlet,	2	0	0	0
Stamford,	4	0	0	0
Readsboro,	2	0	0	0
Arlington,	6	0	0	0
	<hr/> 92	<hr/> 18	<hr/> 45	<hr/> 17

My expense to the State for two years as inspector of apiaries has been

Salary,	\$ 54.00
Expenses,	82.35

Total,	<hr/> \$ 136.35
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REPORT OF J. P. ROCK.**APIARY INSPECTOR.**

In submitting my report as apiary inspector for the season of 1918, I will say that the same will be along the lines of my report for the year of 1917.

A very few of the counties under my supervision were visited this year and practically no disease has been reported to me, which would indicate that the apiaries in those counties are in a good, healthy condition. I am pleased to report that during my six years as an inspector, I find that beekeepers are becoming educated to the advantage of

using modern methods and equipment for the production of honey. The old box hive, which was a harbor for foul brood, is fast passing. The beekeepers are getting more honey from the same number of bees and the product is in a marketable form.

I also find that beekeepers are becoming accustomed to the law to such an extent that they give the inspector great help in the eradication and suppression of foul brood by their willingness to go at the work of cleaning out disease in a wholehearted way. I am quite sure that this co-operation means that in time every beekeeper will act as his own inspector by being forever on the lookout for bee diseases of all kinds.

This year I have visited only four apiaries, three of them being queen rearing yards, all of which were in good condition and free from disease, with the exception of one located in the town of Guilford, where three colonies were suffering from European foul brood. At the present time, however, this same yard is in a state of good health.

No colonies were destroyed, ninety-nine colonies were inspected and the expense of doing this work was \$129.91.

REPORT OF THE LIVE STOCK COMMISSIONER.

The duties of the live stock commissioner, as outlined by law, may be classified as follows:

1. Regulation of live stock imports so that the live stock of the State may be safeguarded against infection from diseased cattle and horses brought into the State.

2. The control of outbreaks of contagious diseases which are dangerous to live stock.

3. The eradication of tuberculosis from the herds of the State, the supervision of tuberculin tests of cattle made for shipment out of the State and the inspection of animals slaughtered for food.

Under the above headings, I beg leave to submit the following report and also to make certain suggestions for the future conduct of the work. Since the duties of live stock commissioner were not transferred by law to the commissioner of agriculture until March 2, 1917, and were not actually taken over until July 1, 1917, this report covers in detail only the year from July 1, 1917, to June 30, 1918, but the tabulated statements show briefly the work done and the funds expended during the fiscal year beginning July 1, 1916.

1. REGULATION OF LIVE STOCK IMPORTS.

The law requires that no cattle shall be brought into the State without the written permission of the commissioner of live stock and requires that no horses or mules shall be imported without such permission, unless the animals are accompanied by a certificate of inspection made by an approved veterinarian in the State of origin. The following table shows the number of cattle, horses and mules imported into Vermont and the precautions taken to prevent the introduction of disease:

CATTLE, HORSE AND MULE IMPORTS, 1916-1918.

Cattle Brought into Vermont on Permits:

	1916-17	1917-18
Tested with tuberculin and passed,	2,384	2,080
Tested after arrival in Vermont, condemned, no indemnity paid,	6	6

Imported on physical examination or certificate of health (practically all young calves),	268	131
For immediate shipment out of the State,	353	371
For immediate slaughter,	50	46
Imported for public auction sales and sold to go out of the State,	361	256
Vermont cattle returning, not tested,	67	48
For breeding purposes, subsequently returned,	0	2
Total,	3,489	2,940
Horses, Mules and Ponies Brought into Vermont:		
Horses physically examined and passed,	3,665	3,175
Mules physically examined and passed,	36	4
Ponies physically examined and passed,	8	0
Horses mallein tested,	417	1,274
Mules mallein tested,	42	
Horses unloaded at Vermont points and at once removed from the State,	792	0
Horses imported for short stay, no examination required,	27	5
Vermont horses returning from fairs,	9	34
Old horses imported for slaughter,	0	13
Total,	4,996	4,505

CHANGES RECOMMENDED.

When cattle or horses are brought into Vermont under the law as it now stands, the commissioner must accept a tuberculin test of cattle or a physical examination of horses made in another State, provided the same is made by a veterinarian approved by the live stock sanitary official of the State of origin. These animals are then regularly admitted to the State of Vermont and if tuberculosis or glanders later develops, the State of Vermont must pay the regular indemnity to the owners of such animals. The commissioner of Vermont should be, in my opinion, empowered to make regulations governing the test or examination which would be acceptable to him and have authority to accept animals subject to quarantine and retest from states, or sections of states, where tuberculosis or glanders are known to exist to a degree which makes necessary additional safeguards.

2. CONTROL OF OUTBREAKS OF DANGEROUS CONTAGIOUS DISEASES.

The infectious and contagious diseases which are most dangerous to our live stock, (other than tuberculosis, which disease will be discussed later) are anthrax, blackleg, hemorrhagic septicemia of cattle, cholera of swine and glanders of horses. I am glad to report that outbreaks of these diseases have been of minor consequence during the past fiscal year and the losses incurred by our live stock breeders have been comparatively small.

ANTHRAX.—An outbreak of anthrax was reported in Lowell in October, 1917, seven cows and three sheep having died from this disease. In accordance with our orders, the local veterinarian promptly placed the infected premises under quarantine and our State veterinarian, Dr. William Campbell, was sent to vaccinate the cattle. After vaccination there was no further trouble and quarantine was removed November 1.

On October 27, another outbreak was reported in Cambridge, twelve head of cattle having died previous to the time the report was made. The premises were promptly quarantined and the remaining animals, eighty head, were vaccinated. Quarantine was removed on November 23.

Since anthrax is a highly infectious disease, fatal to man and animals, and one which will persist for a long period of years, when once it has gained a foothold on a farm, we are following the policy of keeping a record of the farms where outbreaks occur and assisting the owners in vaccinating the cattle each year to prevent the spread of the disease.

BLACKLEG.—Blackleg, while an infectious disease of minor importance, nevertheless causes severe losses of young stock on the farms where it occurs. Since this disease does not spread as rapidly as anthrax, and is not, therefore, as dangerous to the live stock of the State, we have encouraged owners of infected farms to vaccinate their young stock but have not furnished vaccine free of charge, except in cases when we were able to obtain it from the Bureau of Animal Industry.

HEMORRHAGE SEPTICEMIA.—A few cases of hemorrhagic septicemia were reported and our veterinarian visited the farms and assisted the local veterinarian and the owners in the way of giving advice as to sanitary precautions and treatment. This is an infectious disease but does not spread readily from farm to farm.

HOG CHOLERA.—While this is a communicable disease of swine and usually very fatal and causes severe losses in some states, no serious outbreaks of hog cholera were reported during the year. Such cases as developed were handled promptly by the local veterinarian and the hogs were treated at the expense of the owner.

GLANDERS.—Fewer cases of glanders were reported during the last fiscal year than were reported the year before. Thirty-six animals were mallein tested, twenty-four of which were condemned and killed. In cases where other horses had been exposed by mingling with diseased ones, they were held under observation for some time and tested to make sure that the disease had not developed.

CHANGES RECOMMENDED.

The law relating to the control of infectious and contagious diseases is broad and gives the commissioner ample powers to deal with any outbreaks which may occur. We recommend, as a policy consistent with the law and necessary to safeguard the live stock of the State, the following procedure:

In the case of an outbreak of anthrax, that the State quarantine the infected premises of the owner and furnish veterinary service and vaccine for the treatment of all susceptible animals on the farm known to be exposed to anthrax, provided the owner will bury the carcasses of dead animals deeply in quick lime and will disinfect his premises in accordance with the commissioner's directions.

In cases of blackleg and hemorrhagic septicemia, we do not believe quarantine is necessary but we do believe that full instructions should be furnished the owner as to procedure in protecting his live stock from these diseases.

In the case of an outbreak of hog cholera, we recommend the quarantine of all infected premises for forty days and that veterinary service and serum be furnished when this seems necessary to safeguard other swine in the community from the spread of the disease, provided the owner will disinfect his premises and dispose of carcasses of dead animals in accordance with the direction of the commissioner. We do not recommend that the State furnish serum free of cost, except in instances when, for the protection of the swine industry and for economic reasons, it may be necessary and then only when the disease actually occurs and becomes a menace to other swine owners.

In cases of glanders, we recommend quarantining of the premises where an outbreak occurs, the testing of

animals with mallein or by other known methods, and prompt slaughtering and burying of all animals which react to the test, also the thorough disinfection of the premises.

3. THE ERADICATION OF TUBERCULOSIS.

The work done in connection with the eradication of tuberculosis may be divided into four classes:

1st. Private tests made by veterinarians working under the authority of the commissioner of agriculture and paid by the owner.

2nd. Tests of cattle for shipment out of the State, which are made in the same way and also paid for by the owner or the shipper.

3rd. Tests made by the State and Federal governments, which, during the past fiscal year, have been made by veterinarians employed on full time by the State or Federal governments.

4th. The examination of animals slaughtered for human consumption and suspected of having tuberculosis.

The following table shows the number of tests and examinations which were made under the above classifications, with a summary for the same, and the number of slaughtered animals examined:

	1916-17	1917-18
Private Tests: (Cattle.)		
Physically examined,	2	0
Total number tested,	3,285	3,666
Condemned,	207	270
Number killed, no indemnity allowed,	19	8
Held for breeding purposes,		8
Per cent condemned,	.0629	.0736
Shipment out of Vermont:		
Total number cattle tested,	5,630	5,038
Condemned and killed,	153	122
Per cent killed,	.0271	.0242
State and Federal Tests:		
Total number tested,	5,716	7,556
Condemned,	437	1,072
Killed, no indemnity paid,	2	14
Held for breeding purposes,	0	1
No lesions, full appraisal allowed,		2
Per cent condemned,	.0764	.1418
Summary:		
Total number cattle tested in Vermont,	14,643	16,260
Condemned,	797	1,464
Per cent condemned,	.544	.09

**ANIMALS SLAUGHTERED FOR HUMAN CONSUMPTION AND
FOUND TUBERCULOUS.**

1916-1917	248 cattle, 108,732 lbs.	25 hogs, 5,600 lbs.
1917-1918	253 cattle, 100,698 lbs.	23 hogs, 3,936 lbs.

Reference is made to the financial statement on page 61, showing detailed expenditures in connection with these various activities and receipts from salvage.

At the beginning of the fiscal year, a change was made in the method of doing the tuberculin testing which was paid for by the State. Heretofore the testing had been done by local veterinarians on the approved list of the commissioner, who were paid a certain fee for conducting a tuberculin test. At the beginning of the last fiscal year, an opportunity was offered to co-operate with the Bureau of Animal Industry, United States Department of Agriculture, upon terms which seemed very advantageous to the State. The Bureau of Animal Industry agreed to detail one or two veterinarians to Vermont, provided the State would employ, upon salary, an equal number. It was further stipulated that the owner of the herd submitted for test should enter into an agreement with the State and Federal governments to do certain things which were considered necessary to safeguard the herd against reinfection when once it should be freed from tuberculosis. A larger number of temperatures was also required to be taken before and after the injection of tuberculin, which necessitates a period of twenty-six hours or more for making the test. In spite of this fact, however, through the co-operation of the Government, the expense to the State per test has been decreased, even though the time required has been lengthened. The percentage of reactors has also increased, which would seem to indicate that the longer test detects some animals which were not discovered in the shorter test.

**CHANGES RECOMMENDED IN THE POLICY OF TUBERCULOSIS
ERADICATION.**

The eradication of tuberculosis has for twenty-four years been the chief concern of the live stock department of the State of Vermont. During this period, as shown by the table on page 65, 346,154 animals have been tested with tuberculin, of which 25,363 were condemned at a net cost to the State for indemnities and expenses connected with the work, \$781,405.00. The total number of cattle tuberculin tested during this time is nearly equal to the total

number of milch cows and other neat stock in the State last April. The total number of cattle killed as tubercular is nearly equal to the dairy cow population of either one of our two most important live stock counties, Addison and Franklin, and is substantially greater than the dairy cow population of any of the other counties in our State.

We have to the credit of the work done, a number of herds in the State free from tuberculosis and we also have a sentiment on the part of our farmers which is favorable to doing those things which may be necessary to rid our live stock of this disease. Our work in Vermont has also contributed its share toward awakening the live stock breeders of the country to the importance of purchasing live stock from tuberculosis-free herds, which will result in the future in throwing much business to those sections which are furthest advanced in the eradication of tuberculosis. Giving due credit for the good work done in the past and the results which have been attained, the time has come, in my opinion, when the State of Vermont should make certain changes in its policy of tuberculosis eradication which will make the money it expends for this purpose contribute more largely to the desired end, viz., the complete eradication of the disease from our herds.

Experience has demonstrated that an owner may have reasonable expectations of keeping his herd free from tuberculosis, if he subjects every member thereof to an annual tuberculin test, if he promptly removes all reacting animals, if he does not add to his herd animals which are not carefully tuberculin tested, if he does not feed to young animals in his herd milk which comes from tubercular cows and if he keeps his herd under reasonably good sanitary conditions.

It is my opinion that the State of Vermont can well afford to render every breeder who will agree to maintain his herd under such conditions every possible assistance, and, further, give such a breeder distinction by placing his name upon an accredited list, which plan is discussed at greater length on page 58.

The policy which at present exists and is defined by law, requires the State to pay indemnity for animals which are tested privately by an approved veterinarian, even though only a part of the herd is tested. In fact, it is quite the usual thing for live stock dealers in other States to come to Vermont and gather together from a number of different herds one or more carloads of cattle and subject them to the tuberculin test. Under the law, the State pays for condemned animals on the same terms as in the case

where an owner subjects his entire herd to the test and agrees to follow the necessary requirements to keep his herd clean. There may have been left in the herds from which the drover made his purchases, a number of tubercular cattle which will be a source of infection to the healthy animals in these herds, therefore practically nothing has been gained in the way of eradicating tuberculosis, but the money paid for indemnity to the drover is simply an insurance on the part of the State against loss from tuberculosis. I believe that the law should be changed so that the State will not pay for any condemned animals unless the entire herd from which they originate is subjected to the tuberculin test and the owner agrees to do those things which may be necessary to keep it clean thereafter. In this way, the money expended by the State will contribute toward the object in view, viz., the complete eradication of tuberculosis from its herds.

Under the existing law, an owner may make application to the commissioner for a tuberculin test and if the herd has not been tested by the State since 1911 the commissioner, if he thinks advisable, after a physical examination, must give the owner a tuberculin test at the expense of the State. The commissioner has no authority whatever to stipulate under what condition the test shall be made. We have a number of cases occurring where the State in previous years tested a herd until it was free from tuberculosis and paid the owner indemnities for his condemned animals. If the herd had been tested annually and the necessary precautions taken, the herd would have been free thereafter, but the owner pursued the policy of buying in from his neighbors' stock, which had not been tuberculin tested, with the result that his herd was reinfected and the State has again been to the expense of paying for reactors and may do this over and over until the end of time without making any progress in freeing this herd of tuberculosis. The following history of a herd owned by Mr. C. is an illustration:

TUBERCULIN TEST HISTORY OF A VERMONT HERD.

Date of Tuberculin Test.	Number Condemned.	Number Suspicious.	Amount Paid for Indemnity.
February 15, 1910		5	
November 16, 1910	2		\$ 75.00
June 26, 1912	2		71.25
March 2, 1913	1		37.50

April	6, 1915	2		75.00
October	14, 1915	2		75.00
April	11, 1918	27	8	1,308.75
June	29, 1918	2		75.00

In my opinion, the law should be so changed that the owner applying to the State for a tuberculin test must agree to have his herd tested annually thereafter and to keep his herd under such conditions that it will not be infected from outside sources. If this procedure had been followed in the above mentioned herd and tests been made in 1916 and 1917, the State would not have been subjected to heavy expense in 1918 and the owner to severe loss.

ACCREDITED HERDS.

Under the leadership of the Bureau of Animal Industry, what is known as "the accredited herds plan" has been quite generally adopted by several of the States. Briefly summarized, this plan contemplates that after a herd has been tested annually by veterinarians employed by the Federal or State governments, and no reactors have been found for two consecutive tests, and if the herd is maintained under certain necessary regulations to safeguard against reinfection, such a herd will be listed, if it contains one pure bred animal, on the register of the Bureau of Animal Industry at Washington and the register of the State, and shall be known as an "Accredited Tuberculosis-Free Herd". If it contains no pure bred animal, it will be listed on the register of the State alone. The Federal and State governments will enter into a partnership with a herd owner to assist him permanently in maintaining his herd free from tuberculosis. Taking a long view of the matter, it will mean, if adopted on a large scale, that we shall have a number of farms free from tuberculosis and the problem of eradicating the disease from the State will mean simply the addition of other farms as years go by until the entire State is free. Of the 322 herds tested by State and Federal veterinarians under agreement, 124 herds were found free. If these herds pass again this year, we shall have 124 herds on the accredited register.

We have arranged with the Bureau of Animal Industry for the extension of co-operative work for the year beginning July 1, 1918, upon the following terms: The Bureau of Animal Industry, United States Department of Agriculture, is to render to Vermont the following assistance:

1. Pay one-half the salary and expenses of an inspector in charge of tuberculosis eradication in Vermont.

2. Detail two or more veterinarians to do tuberculin testing.

3. Furnish a clerk to keep the necessary records.

4. Furnish as many inspectors as may be necessary to properly disinfect premises where reactors are found.

5. Supply tuberculin for testing and ear tags for animals tested.

6. Pay toward the indemnity for animals which react to the tuberculin test, one-third the difference between the appraised value of such reactors and the amount received for salvage, the appraisal to be made within the limits of the Vermont law.

The following will be required of the State of Vermont:

1. Payment of half the salary and expenses of the inspector in charge.

2. Employment of at least two veterinarians and payment of their salaries and expenses.

3. Provision of necessary office room in the department of agriculture for the conduct of the business.

4. Payment toward the indemnity for reacting animals of the difference between the sum given by the United States Department of Agriculture and the sum to which the owner is entitled under the laws of Vermont.

This co-operative work relates only to tests which are made of herds under the following agreement, signed by the owner, which agreement contains only the necessary requirements for the production and maintenance of a tuberculosis-free herd.

APPLICATION AND AGREEMENT FOR TUBERCULIN TEST.

E. S. BRIGHAM,
COMMISSIONER OF AGRICULTURE,
ST. ALBANS, VT.

Dear Sir:—

I hereby make application to have my herd of cattle located at.....Vt., tested for tuberculosis under the terms of an agreement between the Bureau of Animal Industry of the United States Department of Agriculture and the Department of Agriculture of the State of Vermont, which has for its purpose the eradication of tuberculosis from the herds of the State and the maintenance of officially tuberculosis-free accredited herds.

In consideration of receiving assistance from the Bureau of Animal Industry and the State Department of Agriculture along the lines and for the purpose specified, I,.....do hereby agree

to co-operate with the said Bureau and State officials upon the following terms:—

1. I will permit my entire herd, or any cattle of my herd, to be examined and to be tuberculin tested or retested at such times as are considered necessary by the Bureau or State officials.

2. If any of my cattle are condemned as a result of reaction to the tuberculin test or from physical evidences of tuberculosis, I agree to be to all the expense of slaughtering and disposing of such animals if they are slaughtered on my premises, or, if directed to do so, I will, at my own expense, drive such animals to my nearest railroad station, load them on cars and bill the shipment as directed by the Commissioner of Agriculture of the State of Vermont, or his agent. This shall not be construed, however, as a waiver of my right to hold reacting cattle for breeding purposes, as allowed in section 15 of No. 225 of the Acts of 1915.

3. I hereby agree to accept 75% of the appraised value of all cattle found diseased, in full payment of all indemnity, the limit of appraisal to be determined by the laws of Vermont.

4. I will allow no cattle to be associated with my herd which have not passed a tuberculin test approved by the Bureau or State officials. I will keep all new cattle separated from my herd, pending the application of a tuberculin test by an Inspector of the said Bureau or State or by a veterinarian authorized by the inspector in charge of tuberculosis eradication work in the State. I will notify the proper officials immediately, giving details of the identification, characteristics and records of tuberculin tests of any cattle which may be added to my herd.

5. I will surrender any premises contaminated by tuberculous animals, as indicated by a physical examination or a tuberculin test, to a thorough cleaning and disinfection, at my expense, under the direction or supervision of the Bureau or State officials. I will comply with all reasonable sanitary measures and other recommendations for the control of tuberculosis.

6. When pure-bred herds under this agreement (which shall be defined as herds containing one or more pure-bred animals) have qualified in accordance with the "uniform methods and rules for tuberculosis-free accredited herds of pure-bred cattle", they will be entitled to be placed upon the accredited register of the Bureau of Animal Industry, United States Department of Agriculture, and of the

Department of Agriculture of the State of Vermont. Grade herds which have qualified under the above mentioned uniform methods and rules will be entitled to be placed upon the accredited register of the Department of Agriculture of the State of Vermont. Herds so qualifying will be classed as officially tuberculosis-free accredited herds so long as the conditions enumerated on the back of this agreement are met.

I respectfully recommend to the consideration of the General Assembly, in addition to the limitation of indemnities to those herds in which all the animals are subjected to the tuberculin test, that authority be granted the commissioner to stipulate, as a condition precedent to the making of a tuberculin test at the expense of the State, the regulations laid down on page 59, which have been voluntarily agreed to by all herd owners for whom tests were made in the fiscal year beginning July 1, 1917, with the exception of two. In this way, the money of the State will be so expended that it will contribute in the greatest possible degree toward the complete eradication of tuberculosis from the State. Farms once rid of disease will remain free and the owner will receive such distinction through the accrediting of his herd by the State and Federal Governments that he will receive high prices for his stock sufficient to reward him for the pains taken.

FINANCIAL STATEMENT JULY 1, 1917—JUNE 30, 1918. LIVE STOCK.

DISBURSEMENTS.

		1916-1917	1917-1918
Claims Paid For:			
Cattle condemned and destroyed,	763 head	\$29,039.12	
	1448 head		\$72,961.01
Horses condemned and destroyed,	30 head	1,095.00	
	13 head		876.25
Animals Slaughtered for human consumption and found tuberculous:			
248 cattle, 108,732 lbs.—25 hogs, 5,600 lbs.,		6,365.14	
253 cattle, 100,698 lbs.—23 hogs, 3,936 lbs.,			8,100.72
Vermont milch cows condemned in			
Mass.,	34 head	496.31	
	91 head		1,713.71
Total claims,		\$37,324.44	\$83,651.69
State Veterinarians:			
Salary,	\$2,043.07		
Expenses,	737.89		
	<u>\$2,780.46</u>		

Miscel. Veterinary Services:

Testing,	\$ 244.92	
Examinations,	920.80	
	<u>1,165.72</u>	

3,946.18

All work done previous year by veterinarians
on approved list,

3,257.96

F. L. Davis, Comm., salary and expenses,

3,995.81

Department Expenses:

*F. L. Davis, salary, expenses,	\$ 595.28	
Assistant,	812.50	
Extra clerical help,	48.94	
Postage, telephone, telegraph,	187.46	
Freight, express,	41.20	
Mallein, vaccine, etc.,	41.63	
Printing, stationery,	128.11	
Thermometers, tags, etc.,	229.62	
Miscellaneous,	85.57	
	<u>2,170.31</u>	

Gross expenses,

\$44,578.21 \$89,768.18

RECEIPTS.

1916-1917 1917-1918

Cattle Shipped to B. R. Co.,

45 lots, 459 head,	\$6,189.50	
Less freight,	\$ 976.77	
slaughter	114.75	
commission,	48.51	
	<u>\$ 1,140.03</u>	\$ 5,049.47

160 lots, 1263 head,	\$26,889.29	
Less freight,	\$3,515.16	
slaughter,	941.25	
commission,	116.97	
	<u>\$ 4,573.38</u>	

Sale of ear tags,

22,315.91
.50

Total receipts,

\$ 5,049.47 \$22,316.41

SUMMARY.

	1916-1917	1917-1918
Gross expense as per sheet No. 1,	\$44,578.21	\$89,768.18
Total receipts,	5,049.47	22,316.41
	<u>\$39,528.74</u>	<u>\$67,451.77</u>
Net cost,		

APPROPRIATIONS.

Number 18, Acts 1917,	\$65,000.00
Balance old appropriation,	2,451.85
	<u>\$67,451.85</u>
Less net cost,	67,451.77
	<u>.08</u>
Unexpended balance,	

*Greater part of this expense was for services during previous year.

	1916-1917	1917-1918
Average Salvage per animal,	\$ 11.00	\$ 17.66
Total number herds tested,	272	*322
Average cost of testing, per herd,	\$ 11.98	\$ 9.39
Average cost, per animal,	.56	.40

LIVE STOCK.

July 1, 1917—June 30, 1918.

Cattle Brought into Vermont on Permits:

	1916-17	1917-18
Tested and passed,	2,384	2,080
Tested after arrival in Vermont, condemned, no indemnity,	6	6
Imported on physical examination or certificate of health (practically all young calves),	268	131
For immediate shipment,	353	371
For immediate slaughter,	50	46
Imported for public auction sales and sold to go out of Vermont,	361	256
Vermont cattle returning, not tested,	67	48
For breeding purposes, then taken home,		2
Total,	3,489	2,940

Horses, Mules and Ponies Brought into Vt.:

Horses physically examined and passed,	3,665	3,175	*
Mules physically examined and passed,	36	4	
Ponies physically examined and passed,	8		
Horses mallein tested,	417	1,274	
Mules mallein tested,	43		
Horses unloaded at Vt. points and at once removed from the State,	792		
Horses imported for short stay, no examination required,	27	5	
Vt. horses returning from fairs,	9	34	
Old horses imported for slaughter,		13	
Total,	4,996	4,505	

Vermont Horses:

Physically examined,	10	4
Mallein tested,	105	36
Condemned and killed,	25	24

*These were tested by State and Federal veterinarians.

Private Tests: (Cattle.)

Physically examined,	2	
Total number tested,	3,285	3,666
Condemned,	207	270
No. killed, no indemnity allowed,	19	8
Held for breeding purposes,		8
Per cent condemned,	.0629	.0736

Shipment out of Vermont:

Total number cattle tested,	5,630	5,038
Condemned and killed,	153	122
Per cent killed,	.0271	.0242

State and Federal Tests:

Total number tested,	5,716	7,556
Condemned,	437	1,072
Killed, no indemnity paid,	2	14
Held for breeding purposes,		1
No lesions, full appraisal allowed,		2
Per cent condemned,	.0764	.1418

Summary:

Total number of cattle tested in Ver-		
mont,	14,643	16,260
Condemned,	797	1,464
Per cent condemned,	.0544	.09

REPORT OF THE STATE FORESTER AND THE CHIEF FORESTER, W. G. HASTINGS.

INTRODUCTION.

Section 463 of the General Laws of Vermont (Sec. 9 of No. 17, enacted by the legislature of 1917) provides that thereafter departmental reports be submitted for a fiscal biennium and in accordance with that provision this report will cover the activities of the forestry department for the period July 1st, 1916, to June 30th, 1918, inclusive. It is felt, however, that it is proper at this time to review, in a very limited way, the work of the department for the decade just closing. No attempt will be made to make this a decennial report; rather it is the first of a series of biennial reports, and, falling as it does, in the tenth year of the life of the department, frequent references will be made to the volume and character of work accomplished.

The past two years have witnessed a radical change in the forestry department. The last legislature abolished the old department of forestry and created a new one and imposed the duties of the State forester upon the commissioner of agriculture. The passage of this act was the forerunner of a general retirement of the old forestry personnel. Former State Forester Austin F. Hawes, appointed in April, 1909, tendered his resignation, effective February 1st, 1917. On March 22nd, 1917, A. B. Chandler, assistant State forester under the old regime, was appointed acting State forester and resigned April 7th, 1917. On April 10th, 1917, R. M. Ross, deputy State fire warden under the previous administration, was appointed to succeed Mr. Chandler. On June 12th, 1917, the services of Miss K. M. McCaffery, a clerk in the forestry department for six or eight years, were terminated and the office of Acting State Forester Ross was moved from Burlington to St. Albans. In August, 1917, W. G. Hastings, the present chief forester, was appointed and three weeks later Mr. Ross definitely severed his connection with the State. On March 1st, 1918, Mr. A. J. Eaton was appointed deputy state fire warden and on May 1st, 1918, Miss Kathleen

Walsh was employed to do a part of the clerical and stenographic work of the chief forester's office.

It will be seen, therefore, that practically the entire two-year period has been devoted to reorganizing the forestry department. During the first six months of the biennial period no work of record was accomplished; the second six months saw the disruption of the old and the formation of the new department with no other constructive work accomplished; the third six months period witnessed the appointment of the present chief forester and his becoming familiar with the past forestry work of the State; while the fourth quarter of the biennial period shows the accomplishment of constructive work, which will be reported herein.

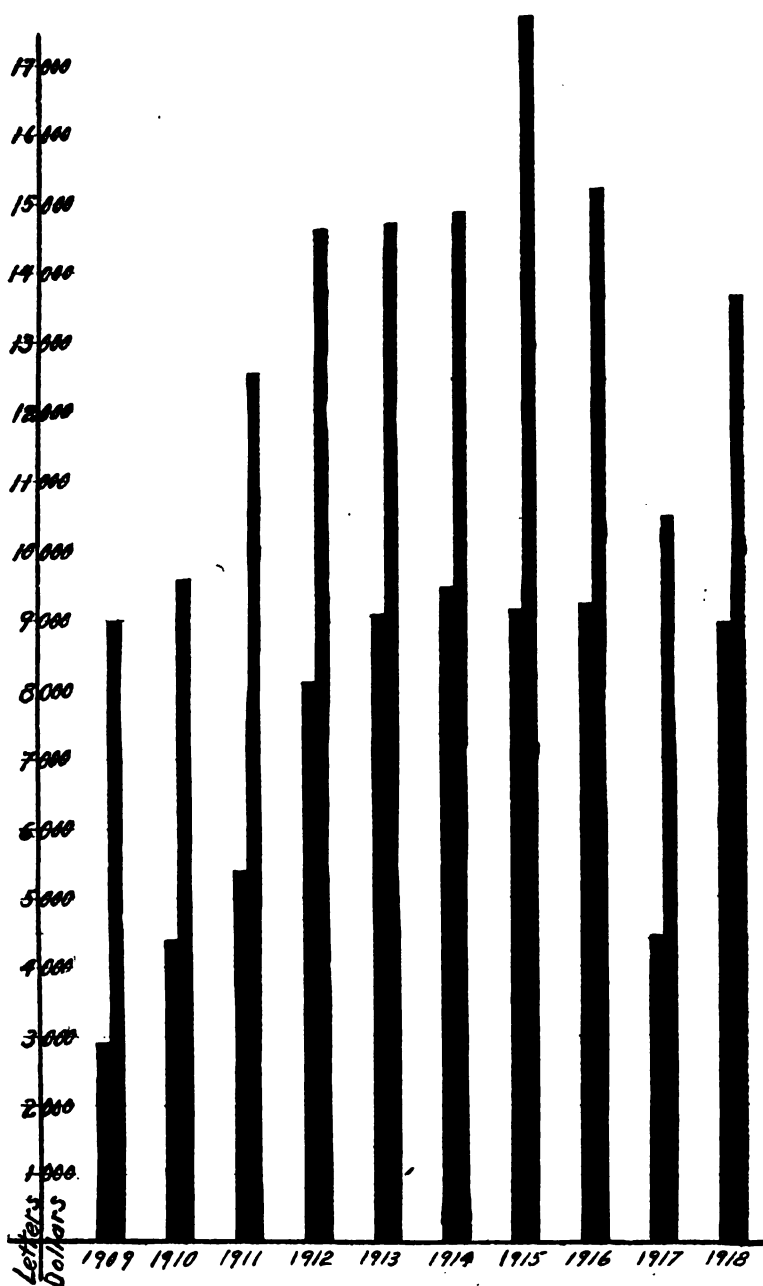
ACCOMPLISHMENT.

On the opposite page is a set of graphs showing by calendar year for a period of ten years the volume of correspondence and the amount of State expenditure for forestry purposes exclusive of the money paid out in the purchase of lands. Probably nothing is more indicative of the service a State department is rendering than the volume of its correspondence. If this be true it will be noted that the period 1909 to 1914 inclusive shows a greater per cent increase in service rendered than in money expended. In other words, in 1914 over twice the value in services rendered was received by the people of Vermont for each dollar of expense as compared to the services and expenditures of 1909.

The collapse in efficiency in 1917 is the result of the resignation of every member of the staff of the old forestry department.

At the beginning of 1918 the department consisted of one man. The first of March, 1918, another member was added and in May still other assistance was employed.

The graph representing 1918 shows the accomplishment for the entire year based on the work completed June 30, 1918. The feeling is strong that the work accomplished will greatly exceed that indicated by the graph.



DEPARTMENTAL ORGANIZATION.

Present Personnel.

The commissioner of agriculture is State forester ex-officio and the forestry department is, therefore, one of the component parts of the more inclusive department of agriculture. The amalgamation of the old forestry, livestock and agricultural departments into a new and greatly enlarged department of agriculture was brought about by the last legislature as an efficiency measure. The law provides that the activities of the forestry department be directed by a technically trained chief forester to be appointed by and to hold his office at the pleasure of the commissioner of agriculture. Besides the chief forester the personnel of the department consists of one clerk, one field assistant, two nursery superintendents, a temporary force of nine men engaged in fire patrol and lookout work and a fire warden service of two hundred and forty odd men.

Other Assistance Needed.

I. FOREST GEOGRAPHER—FIELD WORK.

Qualifications: A young forester or civil engineer.

Duties: Field mapping and drafting in connection with innumerable reports to woodlot owners, which must be made whenever forestry advice is given to farmers and timbermen. The importance of such maps to accompany written recommendations will be at once apparent when we recall that much of the advice given is in the form of a cutting or planting budget, portions of which are not to be executed under five or possibly ten years. Such data can be shown more clearly on a map.

It would also be his duty to axe out and post the boundaries of State forests each year and to do the necessary surveying for the forestry department both on State and private lands. He would have general charge of special uses on forest property such as the leasing of camp sites, building of trails, telephone lines, roads, etc., over State forest property and the sale of hay, pasturage, etc. All of

these several fields of work are being covered in part by the chief forester much to the detriment of more important administrative work.

II. DEPUTY STATE TREE WARDEN—FIELD WORK.

Qualifications: Not a forester but preferably a trained tree surgeon, pathologist and landscape gardener.

Duties: Control of diseases and insects injurious to shade trees, sugar orchards and forests.

Also supervision of the cultivation of roadside trees and town parks. Many of the towns of Vermont were established between 100 and 150 years ago. Street and door-yard trees were then planted; the roadside trees became more or less the object of fostering care and the town "common" has gradually become a park, whose chief adornment is its fine old trees. These are reaching maturity and the decline in vigor will be rapid during the next 25 or 50 years. Since it will take even a greater length of time to replace the old trees with new ones, and since most of the old trees should receive some scientific care, and since almost innumerable inquiries are being made of the forestry department for advice of this nature there should be someone in the department to carry out the wish of the people and give them the advice they so sincerely desire.

It is impossible for the present personnel of the forestry department to find the necessary time to adequately attend to this work.

III. PRODUCTS—FIELD WORK LARGELY.

Qualifications: A technically trained forester, a logging engineer or an experienced lumberman.

Duties: To help the farmers through co-operative purchasing and selling to realize the greatest returns possible for their woodlot products; to encourage the small loggers to adopt more modern methods and to encourage the mills to put in modern machinery and turn out a finished article; to organize wood workers' associations; to gather statistics of production and consumption and through publication of these data to lead the mills to manufacture the products that are locally consumed, instead of causing a "cross shipment" of materials much to the detriment of both producer and consumer. This is perhaps the most important part of forest conservation. There are several fields of thought within the larger field of forest conservation, each of which is exceedingly important if our forests

are to be conserved. The principal lines of thought are forest taxation, fire prevention, reforestation and closer utilization.

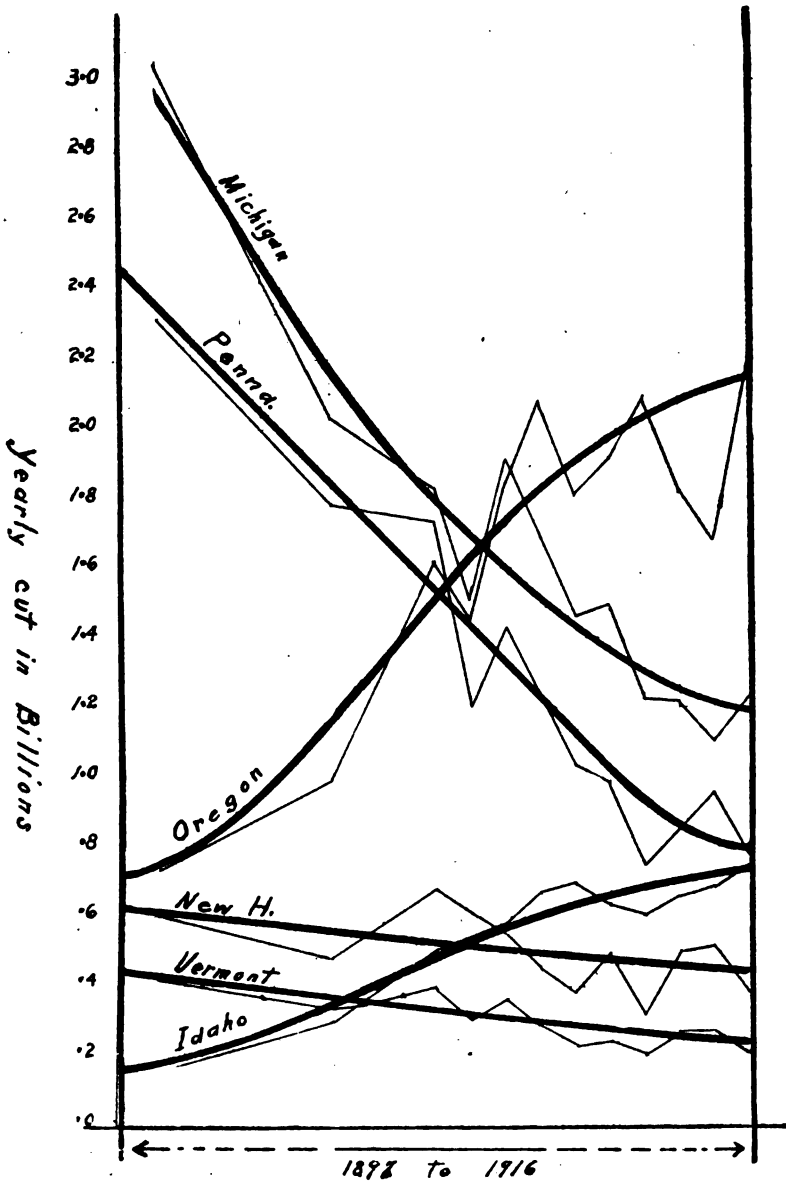
Such an individual would be a valuable addition to the personnel of the forestry department as would also a town forester and a forest geographer. The addition of these three men to the present personnel would triple the usefulness of the department without increasing the expense by more than two-thirds. The work of the department cannot be carried forward in a manner which is of the utmost help to the timberland owners without specialists in these several fields.

The curves on the opposite page show what has happened to the lumber industry in six states during the past two decades. A study of the curves will show that the states of New Hampshire and Vermont have declined in production of forest products to a point where simply the annual growth is now being removed. Their period of rapid decline occurred thirty to fifty years ago and at a still earlier date an equally rapid rise was experienced. Curves for the other states are presented for purposes of comparison. In the light of awakened interest in forestry in Vermont, it seems safe to predict that within a generation her timber production curve will again begin to rise and will thereafter ascend till the yearly cut equals the yearly increment of four million acres of well regulated forest. A conservative estimate would place the figure at one billion feet board measure, or five times the present yearly cut.

LEGISLATION.

A few minor changes in existing laws would create an added interest in the practice of forestry, much to the lasting, indirect benefit of the State at large and to the direct benefit of the several individuals immediately concerned.

(a) State tree warden: A law should be passed making the State forester ex-officio State tree warden, with instructions to employ at State expense a competent assistant (see page 68, deputy State tree warden) who will work under the direction of the chief forester to supervise and direct the work of the town tree warden (and to work directly with any park commission or other body appointed or elected by any city or village) in the care of shade trees within either public or private parks or along roadsides. The forestry department is at present receiving more in-



quiries of this nature than the limited time of the present personnel will permit to answer. There is ample precedent for the above suggested law in Sec. 463 of the General Laws, which makes the State forester ex-officio State fire warden with powers to supervise and direct the work of the town fire wardens.

(b) Fire prevention: A law should be passed requiring the owner of timber land to give to it a nominal amount of fire protection under penalty of having the protection furnished by the State forest service and the expense charged against the property and collected as additional taxes. Occupancy of a farm by an owner or his tenant would be considered adequate protection to the farm woodlot but the non-resident owner of wild mountain land should be required to furnish his property with patrol or lookout protection satisfactory to the State forester or to pay to the forestry department, to be used for such purposes only, a sum not to exceed one cent an acre per year.

(c) Taxation: The fundamental idea underlying tax reform is not to reduce the amount of taxes paid by the owners of forest lands but to so apply the tax that harmful results to forestry will not follow.

This could be secured by levying a yearly real estate tax on the land alone, so long as it remains idle or supports a stand of growing timber, and on both the land and timber as real estate and personal property, when the timber has become mature. The value of the naked land for taxation purposes should be based on its *ability to grow timber* and over ripe stumpage should be listed as personal property and assessed at its full value.

EDUCATIONAL WORK.

(a) Lectures and exhibits: There is no data showing the number and character of lectures given during the first fourteen months of the biennial period covered in this report. In the fall of 1916 the usual exhibits at the county fairs were placed. During the winter 1917-18, a number of lectures were given at various places in the State, many of them in co-operation with the University of Vermont as a part of the agricultural extension school work. Some of these were illustrated by stereopticon slides and at all lectures a general discussion of forestry matters was encouraged. As a result of these lectures many timber holdings were examined and recommendations made concerning

their proper treatment. The practices carried out in this class of work will be explained under the caption "Advice to Private Owners."

(b) Publications: Since the last report of the State forester, the following publications have been issued:— Publication No. 21 "A Marketing Study of Woodlots to Be Made by the Vermont Forestry Department" by A. F. Hawes, 1916. This is a small publication of 1,500 words which can be sent under penny postage and which describes in outline the help the forestry department may be able to give to owners of timber lands and wood lots in the marketing of their products. Publication No. 22 "Instructions to Forest Fire Wardens of Vermont, 1916," is a concise statement of the duties of the town fire wardens and other officials in connection with forest fires and a digest of the forest laws of the State.

(c) Meetings: Upon request of the Governor of Vermont the chief forester represented the State on September 5th, 1917, at the annual meeting of the Society for the Protection of New Hampshire Forests held at Dartmouth College, Hanover, N. H. There was a large attendance and a most instructive meeting was held. The substitution of wood for coal as fuel was the chief topic of interest though its position was crowded for first place by the interest which centered about the outlook for the future of the white pine of America as affected by the White Pine Blister Rust disease. In November the chief forester attended the New England Fuel Conference at the State House in Boston at the bidding of the New England Fuel Administrator, Hon. James J. Storrow. The feeling was strong at this meeting that there would be sufficient coal for all normal needs but that wood should be cut "for use in emergency" in case abnormal consumption should follow. No definite solution to the problem of who should be left with the wood on his hands in case it was not needed was reached. And this, it seems to the present forester, is the one problem to be solved.

During the winter a large number of Grange meetings and other meetings of interest to the farmers of Vermont were attended, at some of which addresses on the subject of farm forestry were given. In May, 1918, at the suggestion of the United States Department of Agriculture a meeting of the various State foresters was held in Washington, D. C., at which a large attendance of entomologists and pathologists and others interested in the control of forest tree diseases and insects injurious to plant life were present as well as many of the nurserymen and florists of the country. The

meeting was held before the Federal Horticultural Board for the purpose of determining whether or not further federal restrictions should be placed on the importation of plants and seeds into this country from Europe. The evidence given by the foresters and others associated with them in the protection of our forests, as well as orchards and farm crops, from the ravages of insects and diseases was overwhelmingly in favor of absolute and immediate prohibition of further importation. The action of the board has not yet been announced but it is confidently expected that as a result of this meeting it will be increasingly difficult to import into this country certain classes of plants and seeds which bring plant enemies with them.

ADVICE TO PRIVATE OWNERS.

The rational treatment of absolute forest lands may be brought about in one of two ways. Either laws may be enacted which will give to the State the power to dictate how private timber holdings shall be handled or interest in forestry may be aroused to such an extent that the owner will voluntarily seek State aid in the management of his timber lands. The first method savors of European autocracy and in those countries where it is practiced it works fairly well. The second method embodies the spirit of democracy; it is the method practiced in Vermont and the method works. Advice to timberland owners will be freely given when it is sought by the individual and when the owner will pledge himself to follow the plans laid down after an examination is made of his lands.

Unsolicited requests for aid are being received as fast as the department can care for them with its present personnel and the demand for aid can be increased "an hundred fold" just as soon as provision can be made in the forestry department to handle the volume of work. It is through co-operation with the thirty thousand odd farmers of the State that mastery of our forestry problem may be expected. The cause of forestry would be slow in coming to its own were forestry, under State supervision, to be practiced upon State forests only, for the State possesses but a negligible quantity of land. On the other hand, the farmers of the State own half of the State's timbered area and it is upon the lands of these many owners and under their fostering care that the most intensive forestry is to be practiced.

The need of co-operation has long been apparent and a policy has been inaugurated in harmony with the wants of the people. The forestry department is prepared to place a limited number of timber tracts under scientific forest regulation each year and has worked out the details of a plan of action to be followed in the co-operative management of farm woodlots. This plan of action is meeting with the approval of the people over the State and bids fair to become the leading branch of our forestry activities—not excluding the protection of our forests from fire. Indeed the time will come when two hundred thousand acres of timber land will be examined annually and placed under scientific rotational regulation.

In giving advice to private owners the State has two definite ends in view, namely, the securing of added revenue for the individual and improved forest conditions for the State. Neither of these points is lost sight of when timber holdings are being examined and reported upon. The owner has but to follow the recommendations given to realize a satisfactory income and build up an enviable forest wealth. The procedure is somewhat as follows:

1st. A cursory examination is made of the timber lot and the owner advised what should be done. Areas in need of immediate cutting are indicated; young stands are pointed out and their proper care suggested; reproduction areas in need of liberation cuttings are described as well as any stands of timber whose growth could be accelerated by thinnings. Often this is all the assistance the owner needs at present and the State's interest drops when the verbal advice is given. But such a condition should not exist. All verbal instructions should be followed by a written report. This lack, however, cannot be supplied until further office assistance has been provided. At other times, the forest property is in need of considerable care which can be secured only by religiously executing some carefully prepared plan.

The details of the plan are covered verbally and followed by a letter embodying the verbal recommendations given and supplying the owner with a tabulated statement of the volume of timber by species, grades, etc., and the value on the stump, and f. o. b. the cars at the nearest railroad landing or delivered at the nearest mill yard.

The advice and various data are given without charge other than the payment of traveling expenses of the State forester or assistant.

2nd. Occasionally an individual is found whose interests in forestry matters are crystalized and whose timber

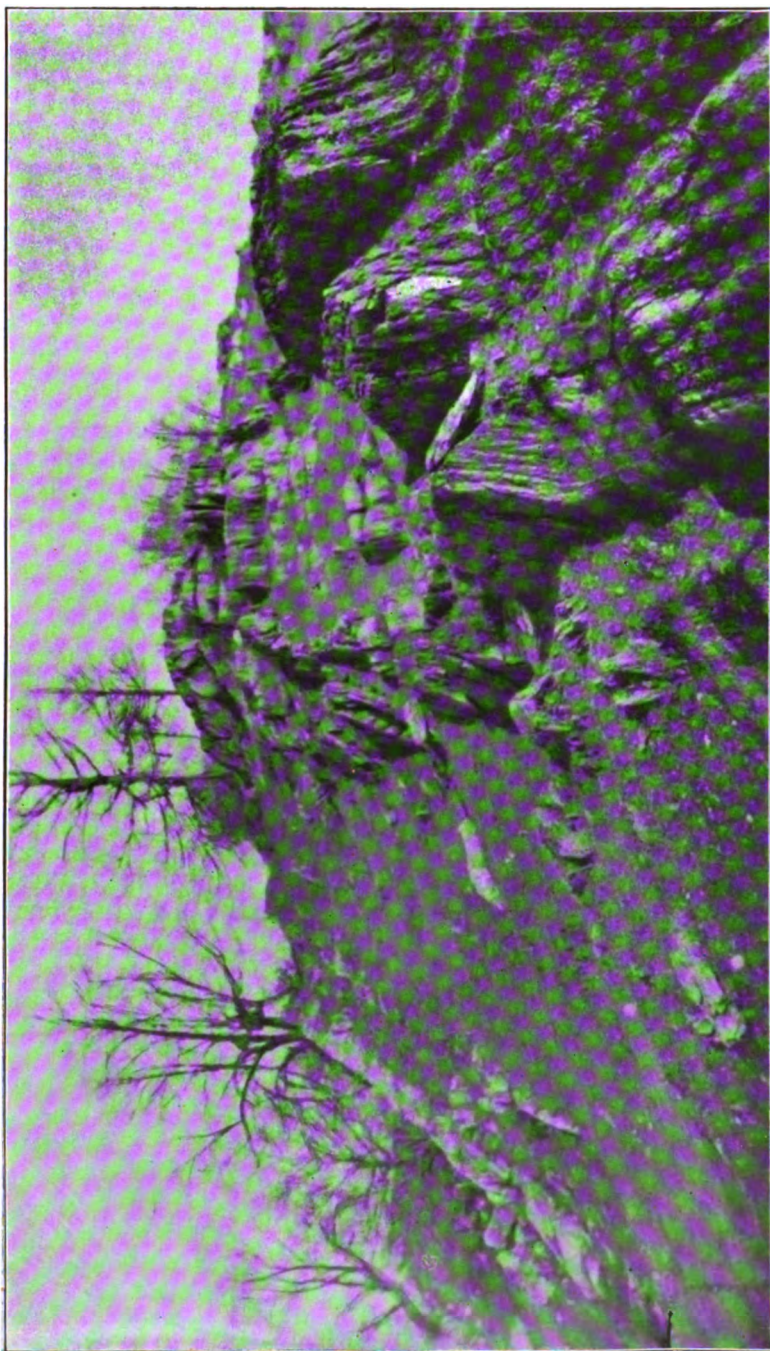
holdings are in such shape that a detailed working plan is advised, based on exact knowledge of present conditions of the stand, soil, drainage, slope, aspect and proximity to markets, etc. To gather these data entails considerable expenditure of time and money.

The plan when completed will cost the owner approximately 15c an acre and will include a high class topographic map of the timber tract showing not only the surface configuration and hydrography but also the location of existing logging roads and the stand of timber by volume and by size or age classes. A written description will accompany the maps showing the quality of the timber, the present rate of growth and decay, the probable future yields under both present and improved conditions and a carefully planned cutting budget and planting program for the ensuing ten years. A statement will also be included showing by example and by diagram how the figures were derived. Only a few such detailed working plans are under way and none have been completed.

Still other forms of assistance will be offered as soon as a satisfactory personnel can be built up.

For a good description of assistance in marketing woodlot products on the stump, the interested reader is referred to the report of the Maryland Board of Forestry for the biennial period 1916-1917.

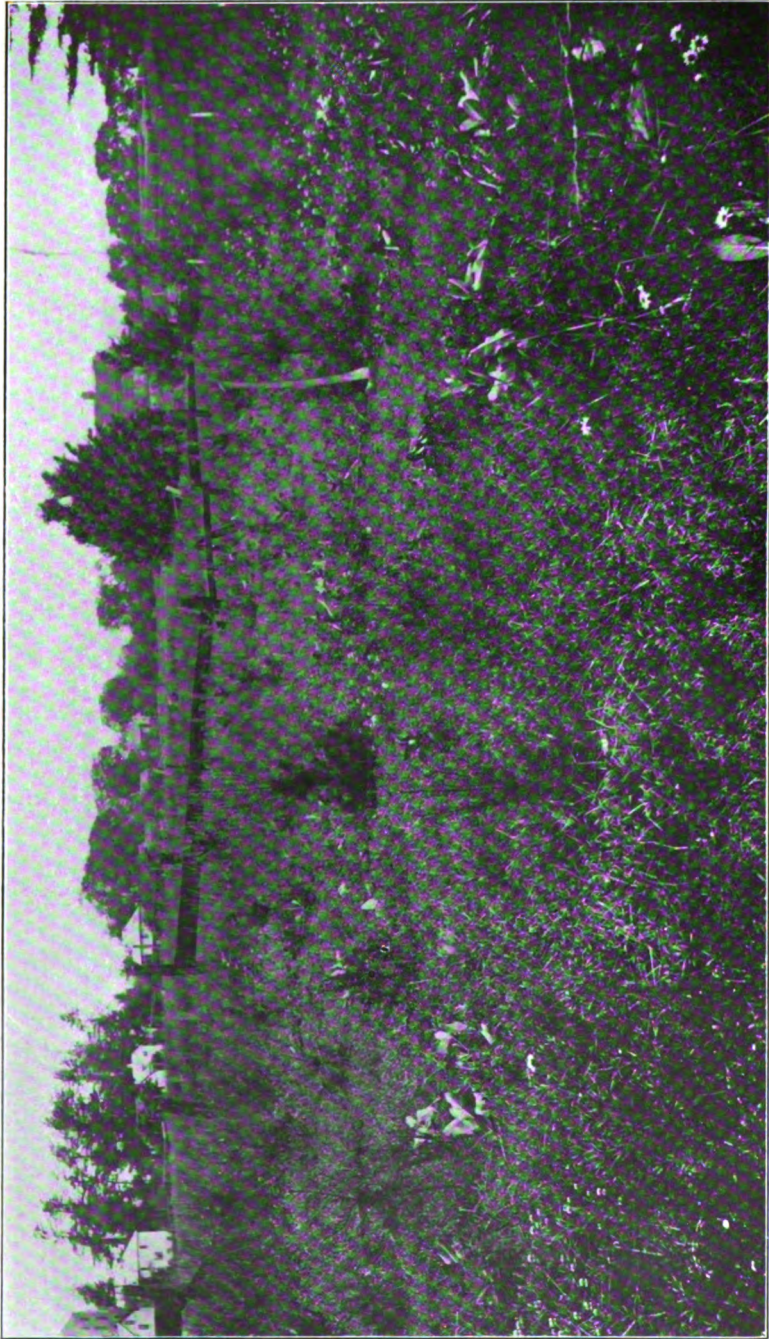
One of the chief subjects of correspondence in the chief forester's office relates to the market price of woodlot products and a market for the disposition of every conceivable kind of material which the woodlot can produce. Hundreds of letters are received and answered each year and many people helped to realize better prices for their logs or standing timber.



SUCH ROCKY AREAS COULD BE DEVOTED TO THE GROWTH OF TIMBER MORE ADVANTAGEOUSLY THAN
TO THE PASTURAGE OF STOCK.







The picture, which is a typical Vermont scene, illustrates Nature's "two-cycle" method of re-establishing a coniferous forest. When the first stand is removed, after the approved method of the lumberman, there remains standing a great quantity of inferior hardwood growth which reseeds itself and takes full possession of the ground and permits the return of an evergreen forest only after the ragged manner illustrated by the photograph.

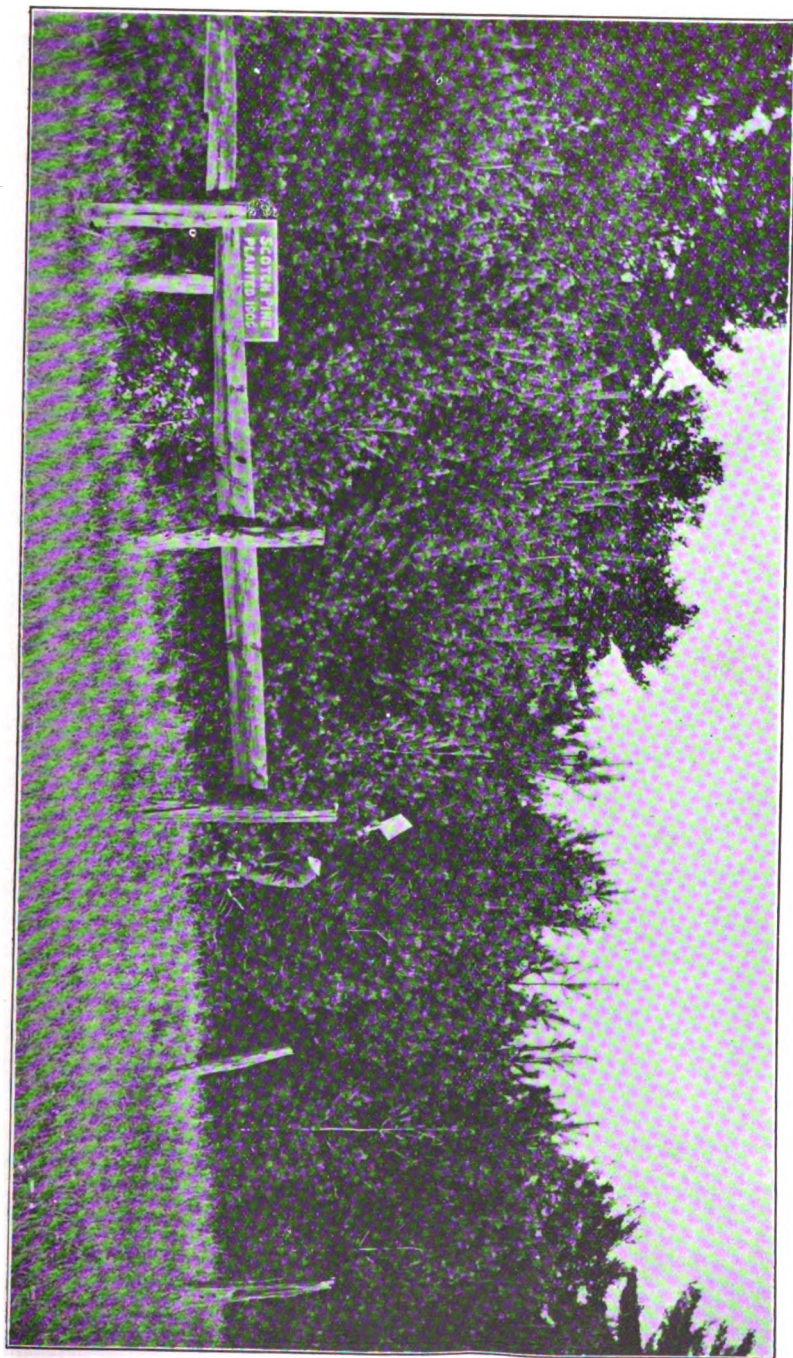
The process is slow and exceedingly costly to those who, like the owners of wood pulp plants, are waiting for a second harvest. A century often shows but little progress toward the second fully stocked coniferous forest.

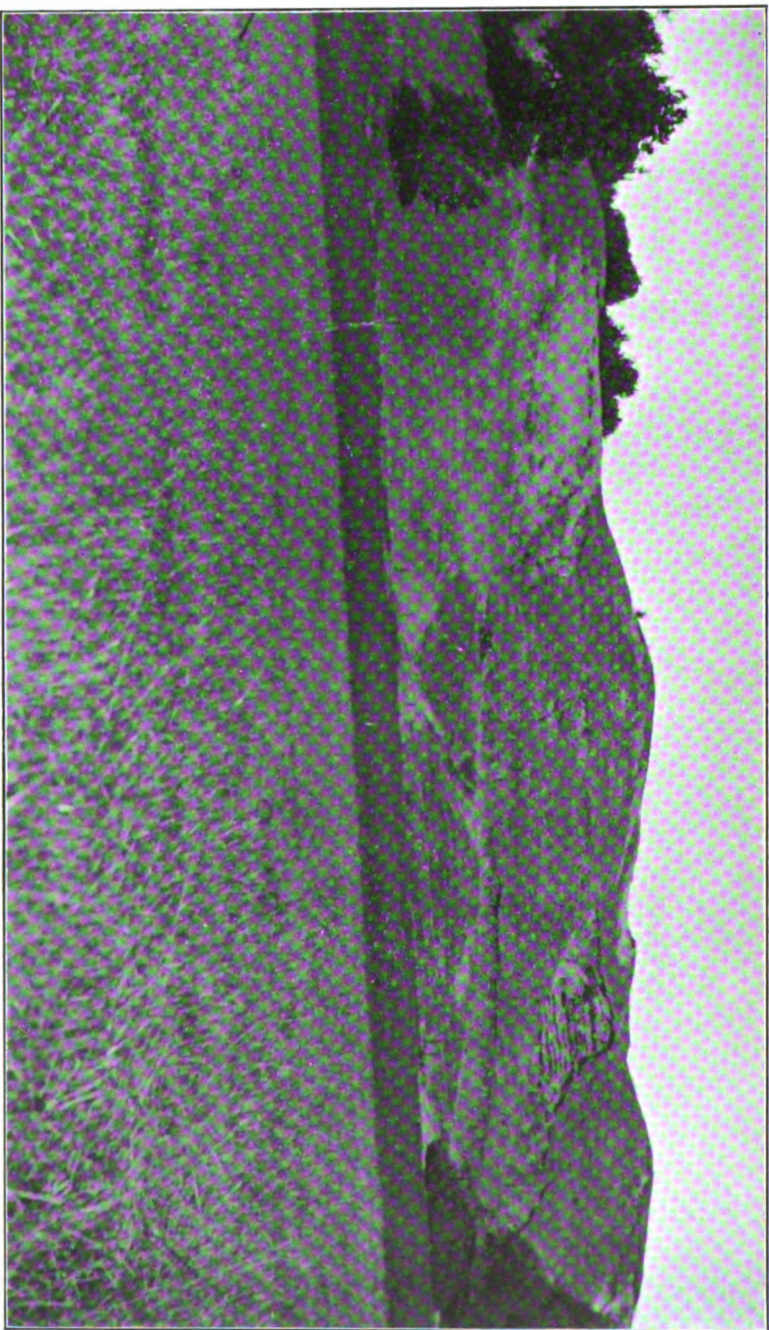
In contrast with the foregoing picture is the one on the opposite page illustrating what may be expected when nothing interferes with the germination of coniferous seed or with the young evergreen seedlings when they have once started. The view shows a young dense stand of coniferous growth possibly 30 years old and shows how the Green mountains of Vermont may some day appear if proper forestry methods are practiced.

This view is loaned by the United States Forest Service. The plate is numbered 96,466 and was exposed by Lage Wernstedt on the Columbia National Forest, Washington.

The opposite picture shows a young plantation of Scotch pine planted in the spring of 1909 on lands belonging to the University of Vermont and illustrates the condition of the plantation a little over one year after planting. Four-year-old stock was used.

The accompanying view is the same (Plate No. 4) plantation eight years later. The picture was taken in the opposite direction and shows what may be expected of Scotch pine ten years after planting on fair quality of sandy soil.





MANY FARMS PRESENT THE CONDITIONS PORTRAYED HERE. SUCH WORNOUT HILL LANDS SHOULD BE PLANTED TO TREES.

REFORESTATION.

(a) Policy: One of the first phases of forestry in which the General Assembly of Vermont interested itself was reforestation. Conservation of our waste lands was the underlying thought. To this end laws were enacted directing that forest tree seedlings be grown by the State forestry department and that they be distributed among citizens of the State at cost.

Such a policy marked an excellent beginning and must be vigorously carried forward in order that most of the reforestation work may be practiced on the farms of the State where it is so badly needed. There are over 33,000 farms in the State and on almost all of them there is a little corner somewhere which might better be devoted to timber production than to agricultural pursuits. The average farm contains 142 acres and 20 acres of it needs planting badly. It has been and still is the State's established policy to encourage the planting of these areas as rapidly as possible. If every farmer within the State would plant 1-20 of his absolute forest land to trees each year, the owner of an average farm would be planting one acre a year and in 20 years our entire planting program would be finished as far as present day waste lands are concerned.

If as much progress can be made in the ensuing decade as has been realized in the past, the State's policies will have journeyed a long way forward on the road toward this Utopian condition. And yet the goal of one-acre-per-farm-per-year is not an impossible task and could be realized under some form of State aid, such as the free distribution of nursery stock under adequate supervision. Aside from direct reforestation, but closely allied to it, is a field of thought which is receiving no consideration from the State. There is an ever increasing demand for young trees for roadside beautification. The State is doing nothing at present to satisfy this demand and while it may never expand its present reforestation policies to include roadside forestry, there nevertheless lies here an important side branch of forestry in the most exact meaning of the word.

(b) Nurseries: The State of Vermont through its forestry department is maintaining two forest nurseries for the production of forest tree seedlings which are distributed at cost among the people of the State for outplanting purposes.

The prices charged during the season 1918 are probably slightly under the actual cost and present a condition which will call for an increase of fully 20% in the cost price of nursery stock in the spring 1920. A very slight increase will be made in the spring 1919 as well.

The following items of expense enter into the cost of producing 1,000 three-year transplants.

The costs for the years 1913 and 1918 are compared and show a 15% increase in cost in 1918.

Seed	\$.63	\$.65
Manure	.10	.12
Labor 1 year	.60	.50
Use of screens	.30	.40
Supervision	.20	.17
Clerical force	.08	.01
Telephone	.03	.01
Water	.02	.01
	<hr/>	<hr/>
1 year seedlings	1.96	1.87
Labor and water		
2nd year	.24	.29
	<hr/>	<hr/>
2 year seedlings in the bed	\$2.20	\$2.16
Transplanting	.90	1.04
Care 3rd year	1.00	1.30
Fertilizer	.25	.36
Water	.04	.02
Boxes	.03	.06
Packing	.53	.64
	<hr/>	<hr/>
3 year transplants packed	\$4.95	\$5.58

The nursery stock at the Sharon Nursery is grown under contract at the following costs to the state:

1 yr. seedlings	\$1.50 pr. M.	sustaining a 33% loss	\$2.00
2 " "	.15 " "	" " 7% "	.16
3 " transplants	1.75 " "	" " 20% "	2.10
Packing, shipping, etc.			.60
Supervision, taxes, etc.			.20
Use of nursery equipment			.40
			<hr/>
3 year transplants packed			\$5.46

The nurseries are located one at Burlington on lands belonging to the University of Vermont, the other at Sharon on the Charles Downer State forest.

The land for the Burlington nursery is donated by the University without cost to the department. It occupies approximately five acres of choice land which may be reached from the Winooski-Burlington car line. Visitors are welcome and will receive courteous attention from the nursery superintendent, Mr. Henry B. Hall. The location of the Sharon nursery, on the other hand, is ill-chosen for general nursery purposes. It is difficult of access, the soil is too heavy, and the elevation of the nursery is so great that early spring work is out of the question. It should, therefore, be used in the future to supply only the Downer State forest and the needs of the local farmers.

Each of the nurseries was at one time equipped to supply a million transplants for outplanting annually. Normal depreciation for several years has accumulated until at present there are scarcely sufficient seed bed frames, shades, screens, tools, etc., for an annual output of more than 500,000 trees from each nursery. In the spring of 1918, one hundred new seed bed frames were built as a beginning toward repair and replacement of the worn out equipment. Inventories on the 30th of June, 1917, and 1918 are given below. The figures for June 30th, 1917, are computed from the counts made in the fall of that year.

	1917.	1918.
Scotch Pine	.....	50,400
Red Pine	100,000	97,540
Norway Spruce	526,000	604,800
Balsam Fir	16,000	16,000
Cedar	15,000	.....
Hardwoods	19,725	2,000
† Seedlings (less than 1 yr.)	296,000 (37 beds)	1,169,000 (167 beds)
	<hr/> 972,725	<hr/> 1,939,740

A comparison of the above inventories will show a 100% increase in our nursery stock on hand at the close of the fiscal year 1918 over that of 1917.

The number of trees in the nurseries has been doubled. This is partly the result of purchases of seedlings from outside of the State, which were transplanted into our nur-

† Such stock is usually not reported till it is a year older and is not included in a more detailed inventory given later in this report.

series, and partly the result of an effort to rebuild by increased sowing the totally wrecked nurseries.

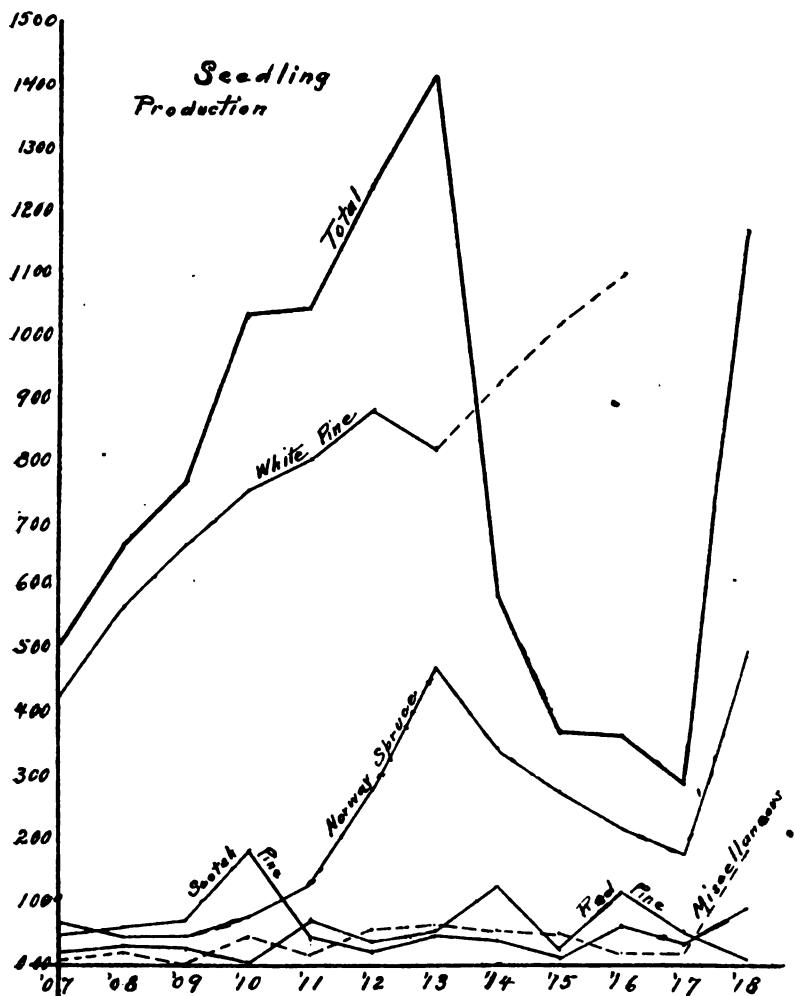
The following purchases of nursery stock were made for transplanting into the Burlington nursery:—

From	Norway Spruce	Red Pine	Scotch Pine
Keene, N. H.	109,000	81,000	
Cheshire, Conn.	50,000	100,000	70,000

In the matter of seedling production we have made even greater strides toward recovery of normal nursery conditions.

The opposite curves represent graphically the rise and collapse of the State nurseries and show the pronounced beginning made during the present year to re-establish them.

It will be noticed that the white pine seedlings produced in 1914, '15 and '16 are not included in the totals for the nurseries because these trees were plowed under in the spring of 1917. They had become infected by the White Pine Blister Rust disease and were, therefore, unfit for outplanting purposes. Four million trees valued at \$16,000.00 were thus destroyed. This nursery stock was the accumulated effort of the forestry department along nursery lines for eight years and was a remarkably praiseworthy accomplishment and the loss cannot be repaired under four years' time. One hundred and sixty-seven seed beds were prepared in the spring of 1918 and we may confidently expect 667,000 transplants for outplanting in the springs of 1921 and 1922 as a result of last spring's sowing. The forestry budget for the ensuing fiscal year provides for the sowing of approximately 300 seed beds in the spring of 1919, which will bring our nurseries back to capacity as far as seedling production is concerned and will re-establish normal conditions in the transplant beds in the spring 1921.



SUMMARY OF STOCK OVER ONE YEAR OLD IN THE NURSERIES ON JUNE 30TH.

Year.	White Pine	Scotch Pine	Red Pine	Norway Spruce	Miscellaneous Conifers	Miscellaneous Hardwoods	Total
1910	1,677,000	293,000	** 7,000	40,000	3,000	3,000	2,023,000
1911	265,000	4,000		25,000			294,000
1912	215,000	15,000		41,500		8,400	279,900
1913	1,840,000	53,000	2,000	40,000	20,000	10,000	1,965,000
1914	2,255,000	125,000		125,000	47,000	10,000	2,562,000
1915	2,880,000	95,000	355,000	○ 90,000	115,000	14,000	3,549,000
1916	2,995,718	423,323	"308,920	○ 38,052	92,285	33,601	3,891,899
1917	*		100,000	526,000	31,000	19,725	676,725
1918		50,400	97,540	604,800	16,000	2,000	770,740

*In the spring of 1917 approximately 4,000,000 trees of this species were destroyed. It was feared they had become diseased.

** 7,000 Austrian pine.

"67,028 Pitch pine.

○ 20,000 white spruce, 30,000 red spruce.

○○ 15,865 " "

(c) Outplanting: Nothing is known of the conditions during the planting season 1917. Owing to the almost unprecedented cold winter and to the backward spring the planting season of 1918 was of short duration. No trees could be shipped from the nursery until April 15th, and by May 10th the planting season was over for all regions below 2,000 feet.

Plants heeling-in at 3,000 feet elevation on Camel's Hump had begun to make growth by May 10th and by May 20th further planting was pronounced impracticable.

Every class of stock in the nurseries which was large enough to ship was exhausted by the orders received for trees and many orders were filled by purchase from commercial nurseries. The fact that we are no longer shipping or recommending the planting of White Pine does not seem to militate against interest in reforestation. As soon as we can supply the trees for planting the farmers of the State will do their part and plant the trees furnished. Interest in reforestation has been thoroughly aroused during the past ten years and the State's inability to furnish the young trees desired is the greatest setback we are experiencing in our reforestation work.

The following tables, arranged by individuals, species, counties, etc., show the trees shipped from the state nurseries during the seasons 1917 and 1918. Also summaries for the past ten years are given. The tables need no explanation.

ADDISON COUNTY.

Cornwall	J. E. Sperry,	500-3 year White Pine
Lincoln	C. A. Purinton,	200-2 year White Ash,
		200- Balsam,
		100- Basswood,
Ripton	W. C. Duncan	12,000-3 year Red Pine,
Shoreham	Winslow Clark	50-3 year Red Pine,
		1,450-3 year Norway Spruce
		500-3 year Scotch Pine,
West Cornwall	Dr. A. W. Bingham	500-3 year Red Pine,
		500-3 year Norway Spruce,
		100-2 year White Ash,
		200-3 year White Cedar,
		250-4 year Balsam,
		250-2 year Basswood.

BENNINGTON COUNTY

Bennington	Frank A. Percy,	50-4 year Norway Spruce,
	The Orchards,	10,000-4 year Norway Spruce,
		7,000-4 year Scotch Pine,
		5,000-4 year Norway Spruce,
		1,000-4 year White Cedar,
	A. J. Dewey,	2,000-3 year Norway Spruce,
	A. H. Winslow,	1,500-2 year White Ash,
		1,000-3 year Norway Spruce,

CALEDONIA COUNTY

Groton	P. M. Abbott,	1,000-3 year	Scotch Pine,
	Peter M. Abbott,	1,000-3 year	Scotch Pine,
	F. R. Dawley,	2,000-3 year	White Cedar,
	H. L. Tillotson,	1,000-4 year	Scotch Pine,
Barnet	Wilbur Nelson,	5,000-3 year	Red Pine,
		5,000-3 year	Norway Spruce,
Ryegate	Harold N. Whitcher,	1,000-3 year	Scotch Pine.

CHITTENDEN COUNTY

Burlington	W. V. Farr,	1,000-3 year	Red Pine,
		200-2 year	White Ash,
Jericho	A. L. Woodbury,	3,000-4 year	Scotch Pine,
	Wm. O. N. Ring,	1,000-3 year	White Cedar,
	John Schillhammer,	3,000-4 year	White Pine,
Lincoln	Moses Carpenter,	1,000-4 year	White Cedar,
Shelburne	J. Watson Webb,	1,000-4 year	White Pine,
Williston	C. W. Brownell,	1,000-3 year	Red Pine,
		1,000-4 year	White Cedar,

FRANKLIN COUNTY

Enosburg Highgate	Mrs. Emily H. Stevens, M. A. Regan,	7,000-3 year	Balsam,
		2,000-3 year	Scotch Pine,
		200-3 year	Red Pine,
		200-3 year	Norway Spruce,
St. Albans Swanton	Kamp Kill Kare, P. J. Farrell,	600-3 year	White Cedar,
		500-3 year	Red Pine,
		500-3 year	Red Pine,
		500-3 year	White Cedar.

GRAND ISLE COUNTY

South Hero,	Guy B. Horton,	100-	White Cedar,
		100-	Spruce
		50-	Balsam.

ORANGE COUNTY

Brookfield	Wallace S. Allis,	50-3 year	Scotch Pine,
		100-3 year	Red Pine,
		100-3 year	Norway Spruce,
Chelsea Fairlee	R. H. Stantou,	1,000-3 year	Scotch Pine,
	W. H. Gahogan,	1,000-3 year	Scotch Pine,
Orange Randolph	John Marston, Clark S. Hall, A. A. Priest,	1,000-4 year	Balsam,
		2,000-3 year	Red Pine,
		1,000-3 year	Scotch Pine,
		1,000-3 year	Scotch Pine,
		2,000-3 year	Red Pine,
		2,000-3 year	Scotch Pine,
		2,000-3 year	Scotch Pine,
		2,000-3 year	Scotch Pine,
Strafford Thetford	H. B. Hancock,	3,000-3 year	Scotch Pine,
	Gardner N. Cobb,	1,000-3 year	Scotch Pine,
	Christine Vaughan,	2,000-4 year	White Pine,
	Maurice C. Bond,	2,000-3 year	Norway Spruce,
	P. H. Teachout,	2,000-3 year	White Cedar,
	Maurice C. Bond,	1,000-3 year	Red Pine,
	Christine Vaughan,	1,000-3 year	Red Pine,

ORANGE COUNTY.—(Concluded.)

Topsham	Mrs. Carrie L. Doe,	500-3 year Scotch Pine, 500-3 year Red Pine,
West Fairlee	Alvah L. Hatch,	1,000-3 year Scotch Pine,
	B. M. Ball,	1,000-3 year Scotch Pine, 250-3 year Red Pine,
		250-3 year White Cedar,
	H. M. Miller,	500-3 year Scotch Pine, 500-3 year Red Pine,
Williamstown	B. M. Ball,	1,000-3 year Scotch Pine,
	Alvah L. Hatch,	1,000-3 year Scotch Pine,
	Lewis D. Martin,	1,000-3 year White Cedar.

ORLEANS COUNTY

Craftsbury	Horace Graham,	1,500-3 year Red Pine,
Glover	B. R. Buchanan,	500-3 year Scotch Pine.

RUTLAND COUNTY

Brandon	Dr. Russell,	2,000-3 year Red Pine,
Florence	Miss Agnes B.	
	Carrigan,	Misc. (School package).
Mendon	Gustah V. Nelson,	2,000-3 year Scotch Pine,
Pittsford	Dr. Edward J.	
	Rogers,	4,000-3 year Red Pine.

WASHINGTON COUNTY

Berlin	T. D. Hobart,	200-3 year Cedar,
		350-3 year Scotch Pine,
		350-3 year Red Pine,
		900-3 year Norway Spruce,
		200-2 year White Ash,
East Montpelier	O. L. Tillotson,	1,200-3 year Scotch Pine,
Marshfield	D. P. Cameron,	25,000-4 year Norway Spruce,
		4,000-3 year Norway Spruce,
Montpelier	T. D. Hobart,	1,000-4 year Norway Spruce,
		500-3 year Norway Spruce,
Plainfield	Ralph W. Putnam	10,000-3 year Norway Spruce,
		1,000-3 year Norway Spruce,
Waterbury	W. H. Martin,	3,775-3 year Red Pine,
		2,225-4 year Larch.
	C. C. Robinson,	
	Waterbury Asylum,	

WINDHAM COUNTY

Athens	F. L. Smith,	2,000-4 year White Pine,
		25- Basswood,
		100-4 year Balsam,
		1,000-3 year Scotch Pine,
		1,500-3 year Scotch Pine,
Brattleboro	H. L. Emerson,	100-4 year Balsam,
		2,000-3 year Scotch Pine,
		2,000-3 year Red Pine,
		10,000-3 year Red Pine,
		2,000-3 year Red Pine,
Newfane	Ariel Cameron,	100-3 year Scotch Pine,
		100-3 year Norway Spruce,
Rockingham	B. E. Merriam,	500-3 year Norway Spruce.
Wilmington	F. J. Corbett,	

WINDSOR COUNTY

Chester	Village of Chester,	2,000-4 year Norway Spruce,
Proctorsville	C. M. Cook	15,000-3 year Red Pine,
Reading	John Sargent,	3,000-2 year White Ash,
Royalton	Chas. P. Tarbell,	600-3 year Scotch Pine,
		600-3 year Red Pine,
Weathersfield	E. W. & C. E. Butterfield,	1,000-3 year Scotch Pine,
		5,000-3 year Red Pine,
White River Jct.	L. R. Harrington,	50-5 year Norway Spruce,
Windsor	Windsor State Prison,	7,000-4 year Red Spruce,
Woodstock	A. L. Powers,	1,000-3 year Red Pine,
	Billings Estate,	24,000-4 year Red Pine,
	Hucsey Farms,	5,000-3 year Red Pine,
	A. B. Morgan,	1,000-3 year Norway Spruce,
		100-2 year White Ash,
	H. H. Daniels' Est.	4,000-3 year Red Pine,
	Richard Marble	3,000-3 year Red Pine.

TEN YEAR SUMMARY BY SPECIES OF TREES SHIPPED FROM STATE NURSERIES 1909-1918.

Year	White Pine	Red Pine	Scotch Pine	Norway Spruce	Cedar	Miscellaneous	Total
1909							195,200
1910	344,500	6,500	15,000	40,700		4,000	410,700
1911	455,600	14,900	20,850	25,250	1,000	16,700	534,300
1912	537,100	1,500	54,700	16,600	1,200	4,450	615,550
1913	602,950		144,750	45,000		31,300	824,000
1914	641,850	54,600	33,400	94,500		13,000	837,350
1915	696,485	24,005	15,775	220,630		34,610	991,505
1916	646,650	36,700	36,050	369,800	2,550	35,300	1,127,050
1917	6,550	100,125	33,750	275,750	13,350	30,400	* 459,925
1918		20,350	13,050	7,900	22,200	19,150	* 82,650

Grand Total.....6,078,230

Of this grand total 1,731,400 trees were planted on State forests leaving a total of 4,346,830 distributed among the people of the State.

*The falling off of trees outplanted in 1917 and 1918 is not the result of decreased interest in reforestation but rather because no more trees were available.

DISTRIBUTION BY COUNTIES OF TREES SHIPPED FROM STATE NURSERIES 1909-1918.

COUNTY.	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	Total
Addison	1,000	5,500	8,300	57,000	3,300	11,000	5,975	7,900	16,800		116,775
Bennington ...	800		12,000	11,200	25,000	16,200	22,200	18,700	25,050	2,500	133,650
Caledonia	11,500	39,800	39,800	29,000	107,600	155,000	46,000	49,500	14,000	2,000	494,200
Chittenden ...	8,500	13,500		5,200	25,100	7,500	16,900	28,000	11,000	1,200	116,900
Essex	1,500		5,000	1,000	10,000	2,000	3,500	20,000			42,000
Franklin	7,600	45,500	43,500	49,200	59,000	53,100	60,750	57,000	11,500		387,150
Grand Isle ...		1,000	1,000						250		2,250
Lamolle	7,500	1,200	29,000	5,000	2,500		1,500	8,000			54,700
Orange	17,750	32,200	16,100	18,500	47,500	57,950	44,350	48,750	19,750	11,000	313,850
Orleans	11,600	11,500	9,000	11,000	6,000	500	12,325	3,650	1,500	500	67,575
Rutland	1,000	2,500	137,500	81,200	46,000	34,000	21,000	138,500	6,000	2,000	469,700
Washington ...	12,100	37,900	15,000	68,500	137,300	89,150	80,200	88,050	43,500	7,200	578,900
Windham	46,250	57,500	62,500	39,000	70,500	64,500	61,950	90,000	5,425	16,000	513,625
Windsor	68,100	128,600	101,600	154,600	117,200	208,250	162,855	41,000	69,350	3,000	1,054,565
On-State Land		34,000	54,000	85,150	167,000	138,200	452,000	528,000	235,800	37,250	1,731,400
Total	195,200	410,700	534,300	615,550	824,000	837,350	991,505	1,127,050	459,925	82,650	6,078,230

FOREST PROTECTION.

Forestry is an undertaking akin to our public highway and public school systems in that the common weal is fostered; it differs from these governmental activities in that a crop is being produced which not only must be grown and harvested but must at all times be protected from a host of enemies, chief among which are fire, insects and disease. It differs also from our most common communistic enterprises in that one generation sows the seed while the second and sometimes the third generation reaps the harvest.

And it is this time element, coupled with the fact that the woodlands of Vermont give employment to a larger number of wage earners than any other industry, which makes protection desirable. A community can ill afford to lose a half-grown crop when a little thought and care might save it. The following original arrangement extracted from the 13th census shows how necessary it is to adequately protect our forests from destruction.

Manufacturing Industries.	Investment.	Production.	Laborers.	Wages.
Lumber, lath, shingles, poles, ties, pulpwood, cordwood, and miscellaneous forest products	\$21,180,000	\$15,551,000	*8,208	\$ 3,603,000
Total of all manufacturing industries in the State	73,470,000	68,310,000	33,788	17,272,000

The real measure of efficiency is *low total loss* sustained (cost of control plus damage caused by fire) and is the

*In addition 27,000 farmers are reported as devoting some time to this class of work.

standard used by the forestry department in determining the efficiency of the warden service. This standard has been chosen because the federal government, the State, and the town are bearing the whole expense of fire prevention, detection and control. This is not wholly as it should be. The owner of a timber lot should not be absolved from all financial responsibility in the protection of his timber from fire. It is true that everyone loses when timber burns and it is also true that the expense of protection should lie largely with the community since the public has a greater financial interest in a piece of standing timber than has the owner of it, but when the community bears all the expense as our present fire law provides, it is equally true that the fire service must so conduct its work that the community interests shall be served. This may lead occasionally to individual losses. For example: Suppose a fire were to start at the foot of a mountain which supports timber of merchantable value but no reproduction; suppose also that the character of the soil is such that no particular damage other than timber loss will follow as a result of the fire; to stop the fire at any point below the summit of the mountain may cost the town and the State more in money than the timber is worth and it would, therefore, be poor economy to do so as far as community interests are concerned. The owner could well afford to do it but the fire service must handle the fire in the most economic way to the State.

Such conditions occur very rarely but the fact that they do occur only goes to show very strongly that the land owner as well as the town and State should be financially interested in the protection of his timber lands. Under a just law which would compel such co-operation, the size of the average fire would represent very closely the efficiency of the fire service.

The following tables show the fires for the past two years:

FIRES REPORTED FOR 1916.

Town.	Date fire started	Duration	Cause	Area burned over—	Damage	Expense of fighting.	Warden
Rockingham	Apr. 20	5 hrs.	Rutland R. R.	.5	\$ 1.00	\$ 5.00	A. R. Downing
Northfield	" 28	6 "	Brush burning	18.	1,215.00	3.20	C. W. Dillingham
Enosburg	" 28	5 "	Unknown	20.	50.00	5.25	C. H. Carpenter
Norton	" 29	8 "	G. T. R. R.	25.	200.00	13.00	Robert Richard
Mendon	" 29	1 day	Unknown	6.		3.50	J. H. Ranger
S. Burlington	May 1	4 "	Unknown	15.	100.00	50.94	W. S. Heath
Corinth	" 1	6 hrs.	Brush burning	75.			C. S. Spear
Bristol	" 5	5 "	"	2.	10.00	4.70	John L. Guinan
Brattleboro	" 6	1 "	C. V. R. R.	.2		1.00	Fred H. Thomas
Bristol	" 7	10 "	Children	3.	20.00	22.29	John L. Guinan
Corinth	" 10	8 "	Brush burning	30.			C. L. Spear
Lunenburg	" 10	12 "	Fishermen	5.	-	25.00	Ira Carpenter
Rutland	" 11	6 "	Incendiary	10.		6.50	J. H. Callahan
Ryegate	" 11	12 "	Portable Mill	14.			J. F. Whitehill
Putney	" 11	1 day	Unknown	25.	52.00	67.00	M. Eug. Robbins
Pownal	" 11	2 "	"				
Northfield	" 11	10 hrs.	Brush burning	50.	50.00	67.75	Chas. E. Johnson
Townshend	" 11	7 "	Smoker	200.	50.00	62.06	C. H. Willard
Dorset	" 11	1 "	House afire	.5	5.00	1.88	A. A. Roberts
Fayston	" 11	9 "	Stearns' Mill	4.		14.00	A. E. Farr
Thetford	" 11	8 "	Smokers	2.	50.00	28.50	A. B. Palmer
Middlesex	" 11	3 "	Saw Mill	200.		3.60	Geo. H. Rumayo
Rockingham	" 13	3 days	C. V. R. R.	.5	5,000.00	131.40	A. R. Downing
Townshend	" 13	1 hr.	C. V. R. R.	1.		1.00	C. H. Willard
Essex Jct.	" 13	4 "	Unknown	10.		2.00	E. A. Martin
Essex Jct.	" 13	5 "	Unknown	15.		5.00	E. A. Martin
Bristol	" 13	24 "	Smoker	15.	200.00	1.83	T. E. Lathrop
Brunswick	" 13	1 1/2 days	Unknown	15.		27.50	James Conn
Monkton	" 14	5 hrs.	Unknown	10.		10.25	D. W. Eddy

FIRES REPORTED FOR 1916.—(Concluded.)

Town.	Date fire started	Duration	Cause	Area burned over—	Damage	Expense of fighting	Warden
Dorset	" 14	4 "	Campers	5.	2.00	1.00	A. H. Roberts
Middlesex	" 14	4 "	Smokers	.5		6.50	Geo. H. Rumayo
Essex Jct.	" 17	3 "	C. V. R. R.	1.		10.00	E. A. Martin
Jamaica	" 19	1 "	C. V. R. R.	1.		3.64	Leon E. Grout
Rockingham	" 20	1 "	Rutland R. R.	.1		3.00	A. R. Downing
Brattleboro	" 25	1 "	B. & M. R. R.	.5	10.00	2.00	F. K. Thomas
Leicester	Sept 9	1½ day	Brush burning	10.	200.00	47.85	G. E. White
Bristol	" 11	24 hrs.	Unknown	2.	50.00	8.28	T. Lathrop
Bristol	" 13	12 "	"	20.	75.00	21.80	John L. Gulnan
Middlebury	" 13	2 "	"	2.		4.75	H. S. Tisdale
Brattleboro	Oct. 28	1 "	B. & M. R. R.	.5		3.00	F. R. Thomas
Middlesex	Nov. 9	24 "	Brush burning	4.		7.00	Geo. H. Rumay
Rutland	Nov. 26	3 "	Rutland R. R.	5.		.200	J. H. Callahan

FIRES REPORTED FOR 1917.

Town.	Date fire	Duration	Cause	Area burned over— Acres.	Damage	Expense of fighting.	
Jamaica	Apr. 3	½ hr.	C. V. Railway	1.	\$ 1.00		Leon E. Grout
Jamaica	Apr. 4	1 "	C. V. Railway	20.	20.00	\$ 8.00	Leon E. Grout
Townshend	Apr. 5	½ "	C. V. Railway	2.		7.00	R. L. Fitch
Brattleboro	Apr. 13	2 "	C. V. Railway	10.		1.20	F. R. Thomas
Brattleboro	Apr. 14	1 "	C. V. Railway	1.	50.00	1.60	F. R. Thomas
Brattleboro	Apr. 14	4 "	C. V. Railway	3.	10.00	1.80	F. R. Thomas
Brattleboro	Apr. 16	2 "	C. V. Railway	1.	5.00	2.20	F. R. Thomas
Jamaica	Apr. 16	2 "	C. V. Railway	10.	50.00	31.58	Leon E. Grout
Jamaica	Apr. 16	3 "	C. V. Railway	45.		31.28	Leon E. Grout
Rockingham	Apr. 16	3 "	Smoker	25.		18.00	J. B. Woolley

FIRES REPORTED FOR 1917.—(Concluded.)

Town	Date fire	Duration	Cause	Area burned over— Acres	Damage	Expense of fighting	
West Haven	Apr. 16	12 "	Unknown	2.	20.00	1.74	G. Bigelow
Rockingham	Apr. 16	3 "	Stump from elec. car.			18.00	J. B. Woolley
Townshend	Apr. 17	½ "	C. V. Railway	25.		1.00	R. L. Fitch
Poultney	Apr. 17	10 "	Unknown	25.	60.00	17.00	W. H. Parker
Townshend	Apr. 19	1 "	C. V. Railway	2.5		3.00	R. L. Fitch
Brattleboro	Apr. 25	5 "	B. & M. R. R.	10.	10.00	1.50	F. R. Thomas
Jamaica	May 4	½ "	C. V. Railway	2.	10.00	2.78	Leon E. Grout
Townshend	May 14	1½ "	C. V. Railway	1.		2.00	R. L. Fitch
Townshend	May 15	20 "	C. V. Railway	25.		36.60	R. L. Fitch
Townshend	May 16	1½ "	C. V. Railway	1.		6.60	R. L. Fitch
Manchester	May 16	4 "	Smoker	4.5		9.13	F. M. Walker
Halifax	May 17	3 "	Brush burning	5.		20.80	H. A. Leonard
Bristol	May 19	15 "	Brush burning	50.	200.00	61.10	John Guinan
Jamaica	May 19	36 "	Smoker	50.	75.00	54.60	Leon E. Grout
Pittsford	May 19	48 "	Brush burning	45.		29.00	C. S. Smith
Rockingham	May 21	24 "	Brush burning	20.	200.00	85.70	J. B. Woolley
Poultney	May 31	4 "	Unknown	15.	50.00	11.00	W. H. Parker
West Haven	June 5	6 "	Unknown	5.	50.00	4.00	G. Bigelow
Fairfax	July 27	48 "	Unknown	3.		32.50	C. Southard
Bristol	July 31	24 "	Campers	3.	75.00	39.57	John L. Guinan
South Burlington	Aug. 5	3 "	Unknown	3.	5.00	5.00	W. S. Heath
Windham	Sept. 18	3 "	Unknown	10.	50.00	15.80	H. L. Hall
Brattleboro	Oct. 2	1 "	C. V. Railway	5.		3.00	F. R. Thomas
Jamaica	Nov. 3	5 "	Hunters	10.	25.00	8.00	Leon E. Grout
Plymouth	Nov. 9	3 "	Wood choppers	50.		21.00	Raymond Moore
Ludlow	Nov. 13	3 "	Hunters	15.		10.75	J. Witmoth
Johnson	Nov. 12	8 "	Hunters	15.		3.50	W. G. Davis

10-YEAR SUMMARY OF FIRES BY NUMBER, CAUSE, AREA, ETC.

Year	No. of Fires	Area Burned		Cost		Damage		Loss		Period of greatest danger
		Total	Av.	Total	Av.	Total	Av.	Total	Av.	
1908	106	15,894	150	10,769	101	31,195	294	41,964	395	October
1909	25	570	23	280	11	985	39	1,265	50	August
1910	42	341	8	471	11	1,035	25	1,506	36	April
1911	70	4,624	66	2,995	43	9,661	138	12,656	181	May
1912	32	1,118	35	4,015	125	1,900	60	5,915	185	July
1913	167	5,635	34	3,116	19	9,847	59	12,963	78	May
1914	137	4,058	30	3,368	25	8,619	62	11,987	87	May
1915	137	4,397	32	4,300	25	8,617	62	12,917	87	April
1916	42	812	20	4,177	99	*7,340	*56	*11,517	*155	May
1917	38	525	13	3,244	85	966	26	4,210	111	May
Av.	79.6	3,797.4	41	3,673.5	54.4	8,017	82	11,700	136.5	

*5,000 dollars of this damage was the loss of mill property, hence the reduction in the figures representing average damage to timber and average loss sustained.

Perhaps the most accurate records kept by the forestry department during the past decade are those relating to forest fires. For each year there are fairly accurate figures representing the number of fires, the acreage burned, the damage done and the cost of protection, etc. For purposes of reviewing that which has been accomplished the decade may be divided into two periods of four and six years, respectively, representing in the first instance a period during which effective federal aid in fire protection was not available and representing in the second case a period during which such assistance was given.

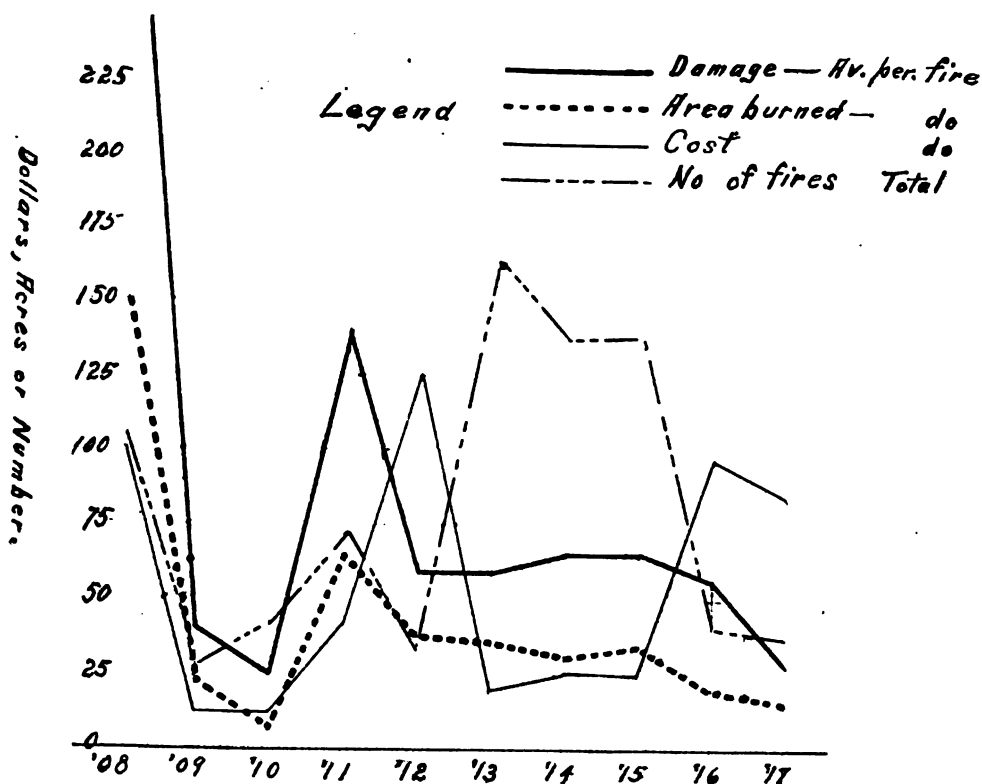
On June 27, 1911, the United States Forest Service entered into a co-operative agreement with the State Board of Forestry to aid in the protection of the forests of Vermont from fire. Since then, the federal government has expended approximately fifteen hundred dollars a year in fire prevention and detection in Vermont, while the State has spent an equal or slightly greater sum. The pronounced beneficial influence which this federal aid has had upon our fire losses stands out plainly in the records and the conclusion is inevitably drawn that money spent on fire prevention and detection, and on the suppression of small fires in a manner which seems wasteful to the casual observer, is money most judiciously spent and also that the goal of our endeavor in efficient forest fire protection, (that is, low total loss) will be reached nearly always by reducing the size of the average fire to a minimum. The graphs on pages 100 and 101 will tell the student of our past fire situations more at a glance than volumes of print. Before studying these graphs, it might be well to consider the following facts:

1st. The criterion of efficiency is a low total loss sustained, determined by cost plus damage.

2nd. The strongest factor militating against efficiency is "hazard" which results from drought, high winds, lightning—conditions over which the forester has no control.

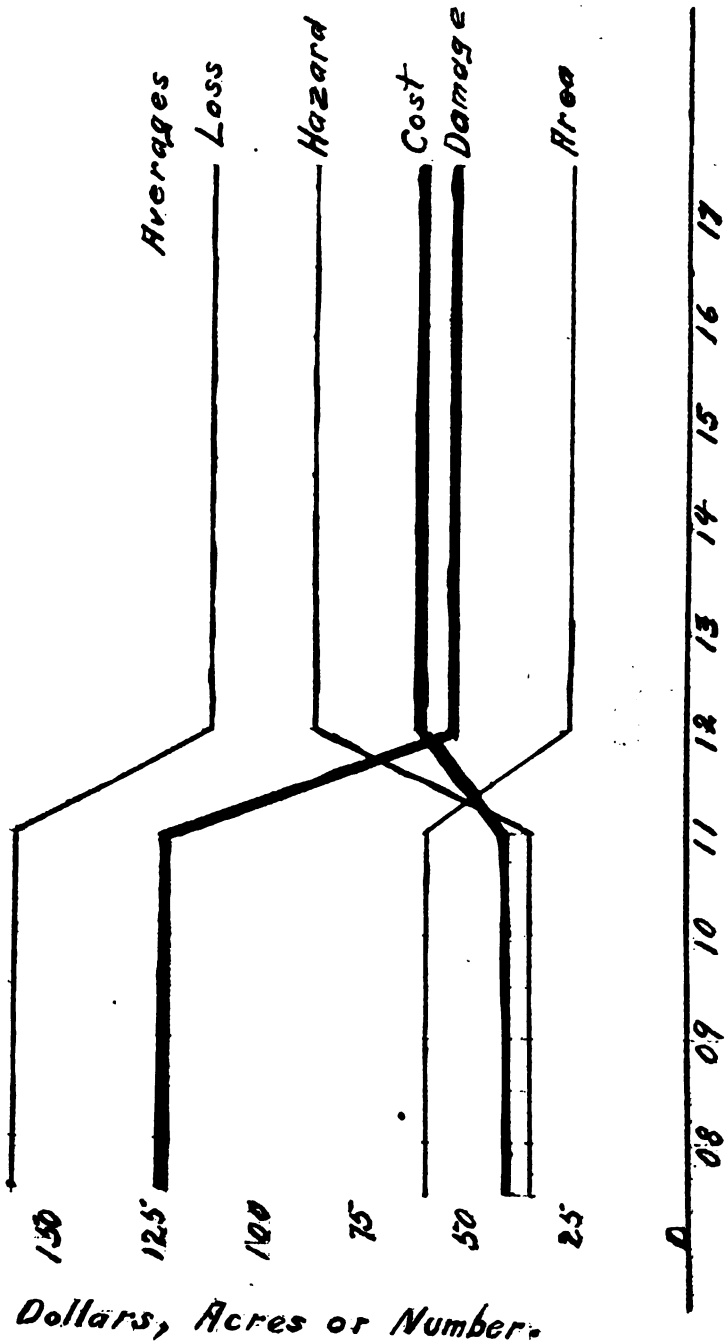
3rd. The best expression of hazard (without employing a complicated formula) is the number of fires which start.

Bearing these facts in mind, these graphs will then show that the fire service has been much more efficient during the second part of the ten year period reviewed—the part in which federal aid has been available.



The above graphic representation of the previous table does not show very clearly the fact that the fire service has been much more efficient during the second half of the period studied. It is a fact, however, as will be shown in the next set of graphs. The graphic statement above, on the other hand, does show very clearly by the apparent irregularity of the curves that there is still room for improvement in our fire protection endeavors.

The following curves show by averages the same data in each of two periods of four and six years respectively. In these graphs the beneficial influence of federal aid in fire protection is most apparent. Note how the Loss, Damage, and Area-burned curves drop, in spite of an increased hazard, when the cost of control is increased. This increased cost lies largely in increased cost of fire detection. Note also the proportionately greater drop in the curve representing damage done compared to the rise in average cost and the further fact that these items are nearly identical.



(b) Lookout study: From the preceding pages it will be noted that the forestry department is each year devoting more and more of its time and moneys to the detection of small fires in order to avoid serious loss from large fires. To make the expenditure of this money increasingly effective, the forestry department has inaugurated a comparative study of the value of its lookout points. Both points which have habitually been occupied in the past and points which have never been used for lookout purposes before are being studied and their value compared. The work consists of visiting a point sketching in the country that can be seen, determining the range of vision in distance, determining the ease or difficulty of adequate supervision, looking out routes for trails and telephone lines, etc. The result will be a more perfect placing of our lookout watchmen.

STATE FORESTS.

During the fall of 1917 the present chief forester, in company with former Acting Forester R. M. Ross, made a tour of inspection of eight of the twelve State forests. Subsequently another of the forests was visited. Conditions on these several forests are in the main progressing satisfactorily though needed improvement cuttings on some of them are being postponed till labor conditions adjust themselves. The plantations on the Charles Downer Forest and on the West River Forest are making noteworthy progress.

The George Aitken Forest at Rutland deserves special mention at this time in connection with the part it played in relieving the fuel shortage in the city of Rutland during the winter of 1917-18. Cordwood for household purposes was sold to seventeen families and to one business concern amounting in all to 792 cords. This relieved the coal situation in the city by several hundreds of tons and demonstrates the value of the presence of a State forest near enough to a large city to enable the residents of the city to cut their own household wood at odd times and thereby obtain it in most cases simply for the cost of drayage plus a very nominal stumpage fee.

Others of the State forests are also answering an economic purpose. Some of the maple trees on the Proctor-Piper forest were tapped for sugar, hay has been sold from

the Mansfield forest; a small number of cattle have been grazed on the L. R. Jones forest; camp site privileges have been leased for logging purposes on the Battell forest; wood has been sold from the Charles Downer forest and everywhere the State forests have served the educational, recreational and protective purposes for which they were created.

The following is a statement of the location and acreage of the several state forests:—

Geo. Aitken,	Mendon,	800 Acres
Arlington,	Arlington,	225 "
Battell,	Camel's Hump,	4,500 "
Downer,	Sharon,	800 "
Hapgood,	Peru,	100 "
L. R. Jones,	Plainfield,	600 "
Lyndon,	Lyndon,	75 "
Mansfield,	Mt. Mansfield,	5,000 "
Proctor-Piper,	Cavendish,	400 "
Putnam,	Worcester,	1,400 "
Townshend,	Townshend,	700 "
West Rutland,	West Rutland,	350 "

**EXPENDITURES FOR THE TWO YEARS' PERIOD
ENDING JUNE 30, 1918.**

	1917	1918
Salary, State Forester and assistants	\$ 3,528.37	\$ 2,591.63
Travel, hotel etc., Forester and assistants	876.81	888.84
Fire Protection	426.74	856.20
Pine disease eradication	315.97	
Telephone, Telegraph, Postage	260.62	8.17
Freight, Express & Drayage	108.20	3.83
Supplies and Equipment	97.16	192.00
Exhibits, Insurance & Miscellaneous	43.35	
Private Advice	9.45	14.00
State Nursery at Burlington	1,520.08	3,609.75
State Forests:		
Geo. Aitken	\$ 138.50	\$ 42.50
Arlington	5.00	30.53
Battell	979.51	1,328.10
Bromley Mt.	20.04	—
Downer	3,240.21	1,286.64
L. R. Jones	6.15	35.33
Lyndon	76.52	—
Mansfield	164.17	538.51
Proctor-Piper	5.86	84.66
Putnam	5.50	51.40
Townshend	—	98.21
	4,641.46	3,495.88
Totals.....	\$11,828.21	\$11,698.25

To these totals should be added for 1917 \$290.92 and for 1918 \$302.75, paid directly by the Auditor of Accounts making a total of \$12,119.13 for 1917 and \$12,001.00 for 1918, exclusive of any money set aside for the purchase of

land. For the purpose of land purchase there is now available \$11,795.42 derived as follows:

Unexpended Accumulated earnings to June 30, 1917,	\$ 2,960.37
Unexpended Earnings of department fiscal year 1918,	1,785.05
Unexpended forestry allotment 1918	3,050.00
Land purchase appropriation 1918	4,000.00
Total.....	<u>\$11,795.42</u>

REPORT OF STATE SCHOOLS OF AGRICULTURE

Under Section No. 1407 General Laws.

Randolph School

T. N. Vail School

APPROPRIATIONS.

\$12,000	July 1, 1916-June 30, 1917	\$20,000
\$15,000	July 1, 1917-June 30, 1918	\$22,500

EARNINGS	July 1, 1916	July 1, 1917	July 1, 1916	July 1, 1917
	June 30, 1917	June 30, 1918	June 30, 1917	June 30, 1918
School and Dormitories				
Tuition	\$ 100.00		320.00	245.00
Board	4,270.92	4,177.51	11,824.61	6,429.32
Room	341.55	26.00	3,179.98	1,285.83
Miscellaneous	252.04	528.37	1,215.04	1,428.80
Total	4,964.51	4,731.88	16,539.63	9,388.95
Farm				
Farm Products	756.81	1,939.38	3,676.19	9,140.34
Live Stock	441.01	862.18	3,697.06	11,365.97
Dairy	2,062.04	3,232.01	6,616.08	6,569.19
Poultry	271.17	411.28	244.48	161.02
Swine	477.81	655.22	1,898.79	2,137.02
Horses	5.14	409.89		916.00
Miscellaneous	66.84	13.00	1,019.75	1,486.85
Total	4,080.82	7,523.46	17,152.35	31,776.39
Lighting Plant			567.86	574.32
Grand Total—Earnings \$	9,045.33	\$12,255.34	\$34,259.84	\$41,739.66
EXPENSES .				
School				
Salaries—Wages	\$ 7,375.46	8,298.88	9,952.52	9,530.77
Supplies	1,944.17	2,159.39	787.24	10,134.44
Repairs	322.82	186.84	16.85	243.31
Miscellaneous	298.35	251.82	778.96	2,609.38
Total	9,940.80	10,896.93	11,535.57	22,517.90
Dormitories				
Wages	1,594.73	1,521.84	4,957.85	1,393.18
Supplies	3,525.35	2,776.19	10,138.47	6,941.32
Repairs	49.24	45.19	141.28	233.44
Miscellaneous	39.60	115.01	385.16	174.20
Total	5,208.92	4,458.23	15,622.76	8,742.14
Farm				
Wages	2,274.31	2,965.92	15,650.00	12,494.84
Supplies	2,815.83	4,037.57	8,378.82	20,116.32
Repairs	60.35	131.75	287.77	891.23
Miscellaneous	45.25	150.66	745.41	610.70
Total	5,195.94	7,285.90	25,062.00	34,113.09
Lighting Plant			1,103.85	1,151.36
Improvements	493.92	4,514.73		
Grand Total—Expenses	\$20,839.58	\$27,155.79	\$53,323.98	\$66,524.49
Deficit or Surplus	\$11,794.25	\$14,900.45	\$19,064.14	\$24,784.83

At the Vail School outstanding bills amounting to \$3,673.67 June 30, 1917, were paid in part from the surplus, \$935.86, of the appropriation for that year. The balance was paid from funds available for the year ending June 30, 1918.

VERMONT DAIRY STATISTICS.

Year Ending December 31, 1917.

COMPILED BY VERMONT DEPARTMENT OF AGRICULTURE.

Amount of Products Handled by the Various Dairy Manufacturing Plants and Prices Paid for Same. Reported by Months.

Month.	Pounds of Milk Shipped.	Price per Cwt.*	Total for Milk Shipped.	Pounds Milk Condensed.	Price per Cwt.*	Total for Milk Condensed.	Pounds Milk made into Cheese.	Price per Cwt.*
January,	9,266,156	\$2.187	\$ 200,906.75	2,632,308	\$2.192	\$ 57,705.88	158,501	\$1.979
February,	8,882,742	2.140	189,203.23	2,890,782	2.149	62,148.32	166,257	2.286
March,	10,470,566	2.075	215,405.55	4,743,136	2.143	101,681.79	221,418	2.370
April,	11,195,314	2.098	233,262.05	5,933,876	2.079	123,385.49	568,170	2.386
May,	13,298,916	2.054	271,915.52	6,620,400	2.053	135,962.97	1,493,723	2.191
June,	15,531,710	2.030	314,074.87	6,534,262	2.505	133,989.94	3,025,842	2.050
July,	15,685,145	2.090	326,717.09	5,946,982	2.135	126,974.46	3,084,915	1.981
August,	14,072,954	2.573	360,712.17	4,742,580	2.554	121,163.88	2,016,251	2.047
September,	12,687,973	2.587	325,967.50	4,830,460	2.559	124,934.94	1,860,789	2.431
October,	12,231,217	3.196	387,544.78	3,290,066	3.218	105,884.40	1,504,935	2.138
November,	9,808,361	3.264	317,944.48	2,059,655	3.451	71,090.42	522,514	2.516
December,	10,250,573	2.974	300,359.58	2,451,799	3.275	80,317.46	300,848	3.120
Total,	143,381,667		\$3,453,913.57	52,726,306		\$1,245,239.95	14,928,163	
Average,		2.439			2.526			2.290
Not reported by months,	10,003,441		243,983.93				9,076,887	
Grand total,	153,395,108		\$3,697,897.50	52,726,306		\$1,245,239.95	24,000,000	

*Average, all factories.

Total value of all Dairy Products handled by factories, 1917, \$13,372,838.63.

The monthly prices are computed on basis of amount of milk received and the money paid for same.

The average price for the year is found by dividing monthly prices by 12.

"Not reported by months" includes such reports where definite records about receipts and prices were unobtainable at the plants.

The average sales prices were used in figuring its value.

With milk figured at 3.7% B. F. the Vermont Dairy plants handled 25,561,004 lbs. butter fat in 1917.

Making allowance for milk and cream consumed in the state and butter made on the farm we have approximately 10 million pounds more butter fat or a total production for the state of 35 million pounds butter fat and a total value of Vermont's Dairy products exceeding \$18,000,000.00 for 1917.

With added value for skim milk used on the farms the total will exceed \$22,000,000.00.

There are 1741 milking machine users reported for the State with approximately 2,000 units.

VERMONT DAIRY STATISTICS.

Year Ending December 31, 1917.

COMPILED BY VERMONT DEPARTMENT OF AGRICULTURE.

Amount of Products Handled by the Various Dairy Manufacturing Plants and Prices Paid for Same. Reported by Months.

Months.	Total for Milk made into Cheese.	Pounds B. F. Sold as Sweet Cream.	Price per lb. B. F.*	Total for Sweet Cream.	Pounds of Butter Fat made into But.	Price per lb. B. F.*	Total for But- ter Fat made into Butter.
January,	\$ 3,136.73	418,980	\$.477	\$198,390.53	581,735	\$.445	\$ 258,562.09
February,	3,800.63	451,227	.484	217,462.66	572,357	.460	262,758.42
March,	5,247.80	546,358	.454	247,228.98	747,601	.487	363,189.67
April,	13,556.53	655,874	.484	315,733.04	862,547	.485	416,823.74
May,	32,727.48	769,374	.455	348,934.71	1,050,746	.505	529,105.67
June,	62,029.76	1,026,208	.428	437,874.50	1,445,997	.415	598,336.93
July,	59,564.71	945,516	.443	417,047.52	1,191,647	.416	494,235.30
August,	41,252.19	747,706	.471	347,620.60	862,726	.455	392,056.71
September,	45,235.78	575,438	.496	278,040.37	730,017	.489	356,043.24
October,	32,175.55	456,818	.488	217,353.79	692,145	.504	349,143.38
November,	13,146.45	340,286	.495	165,444.24	519,360	.503	261,422.56
December,	9,356.46	310,570	.510	156,408.36	477,229	.522	249,126.48
Total,	\$321,260.06	7,244,350		\$3,347,539.30	9,734,107		\$4,530,784.19
Average, Not reported by months,	197,859.56	68,055	.474	32,258.07			
Grand total,	\$519,119.62	7,312,405		\$3,379,797.37	9,734,107		\$4,530,784.19

*Average, all factories.

Total value of all Dairy Products handled by factories, 1917, \$13,372,838.63.

The monthly prices are computed on basis of amount of milk received and the money paid for same.

The average price for the year is found by dividing monthly prices by 12.

"Not reported by months" includes such reports where definite records about receipts and prices were unobtainable at the plants.

The average sales prices were used in figuring this value.

Making allowance for milk and cream consumed in the state and butter made on the farm we have approximately 10 million pounds

more butter fat or a total production for the state of 35 million pounds butter fat and a total value of Vermont's Dairy products

exceeding \$18,000,000.00 for 1917.

With added value for skim milk used on the farms the total will exceed \$22,000,000.00.

There are 1741 milking machine users reported for the State with approximately 2,000 units.

**SUMMARY OF THE WORK OF THE VERMONT CATTLE COMMISSION AND VERMONT LIVE STOCK COMMISSIONER SINCE THE LAW
WENT INTO EFFECT IN 1894, INCLUDING NUMBER OF CATTLE TESTED, AND KILLED; EXPENSES UNDER VARIOUS
HEADINGS; AND THE TOTAL NET COST TO THE STATE FOR THE PERIODS AS GIVEN.**

	Cattle Tested.	Cattle Killed.	Percentage.	Paid for Cattle Killed.	Paid Veterina- riana.	Paid Commis- sion or Depart- ment Expense.	Paid Butchers' Claims.	Paid for Ver- mont Milk Cows con- demned and killed in Massachusetts.	Paid for Horses.	Received from Sale of Hides and Carcasses in Vermont.	Net Cost of Work to Vermont.
1895-6	14,155	924	.0652	\$ 13,647.67	\$ 4,210.84	\$ 2,829.70	.....	.....	\$ 248.75	.....	\$ 20,936.96
1897-8	45,044	1,456	.0823	22,220.75	7,536.40	4,310.79	.....	.....	110.00	.....	34,177.94
1899-1900	13,694	528	.038	7,769.75	2,936.28	2,622.57	.....	.....	102.00	.....	.....
1901-2	25,273	2,191	.0866	33,000.58	7,623.55	4,352.30	.....	.....	57.00	(Sheep)	13,514.60
1903-4	21,056	1,551	.0736	35,941.07	2,515.92	5,780.91	\$ 3,849.09	.....	140.00	.....	45,116.43
1905-6	29,398	2,724	.092	64,482.48	3,026.24	6,810.57	\$ 3,340.65	\$ 4,902.33	260.00	.....	48,346.99
1907-8	39,555	3,254	.0822	72,416.82	16,952.65	4,779.75	.....	3,047.81	170.00	\$20,328.30	62,403.97
(20 months)									1,172.25	.....	98,369.28
Sept. 1, 1908 to June 30, '10	44,014	4,439	.1009	102,465.33	19,310.40	6,955.43	4,398.49	3,168.89	1,803.75	7,846.75	188,102.29
(22 months)											
July 1, '10 to June 30, '12	28,071	2,132	.0759	56,993.83	12,499.15	7,388.05	6,025.00	3,079.93	776.25	7,441.38	79,320.83
July 1, 1912 to June 30, 1914	27,172	1,941	.0714	49,477.16	8,001.70	7,450.95	6,334.37	1,753.52	755.25	*6,756.64	67,516.31
July 1, 1914 to June 1, 1916	27,828	1,978	.0710	63,272.39	6,797.10	7,570.33	7,501.11	1,311.62	1,698.75	*12,266.96	75,984.14
(21 months)											
June 1, 1916 to											

VERMONT STATE FAIR COMMISSION.

JAMES B. ESTEE, PRESIDENT, MONTPELIER, VT.

H. L. HATCH, VICE-PRESIDENT, RANDOLPH, VT.

To Vermont State Fair Commission :—

The 1917 State Fair was not held as published and prepared for by me under the direction of the President and Executive Committee owing to an order received July 19th from the State Board of Health instructing that no fairs be held in the State unless permission was granted by the Board of Health at a later date. This order was issued on account of the wide spread prevalence of infantile paralysis throughout the state.

The preparation for holding the State Fair had been extensive and complete up to the date of receiving this order from the Board of Health, and corresponding obligations and expenses had been incurred. Upon receipt of the order the executive committee voted to discontinue the fair, and instructed me to pay or adjust all outstanding and unsettled bills and contracts. This was done on the most favorable terms obtainable and the year's work concluded.

Total income \$3,845.24; disbursements \$3,466.90; balance \$378.34 remitted to State Treasurer December 4, 1917.

Respectfully submitted,

F. L. DAVIS,

Secretary-Treasurer.

White River Jct., Vt., Dec. 4, 1917.

1917 LISTERS' CENSUS COMPILED BY SECRETARY OF STATE.

ADDISON COUNTY.

TOWNS	No. of maple trees avail- able and not tapped.	No. of maple trees tapped.	No. of pounds of maple sugar made.	No. of gallons of maple syrup made.	No. of horses.	No. of milch cows.	No. of oxen.	No. of other neat stock.	No. of swine.	No. of sheep.	No. of acres of tillage land.	No. of acres of pasture land.	No. of acres of orchard land.	No. of acres of forest or wood land.
Addison	2339	2200			519	1526	*2	1038	300	916				
Bridport	5275	375		90	462	1428		700	400	1195				
Bristol	7325	15175	18800	675	392	828	14	788	327	93	3783½	4224	39	5208
Cornwall	6500	2285	200	520	456	1061	*4	612	213	1028				
Ferisburgh														
Goshen	1200	6490	9000	223	88	159	16	149	62	53	2070¾	3436	10	6689½
Granville	14220	17450	5400	1950	130	329	8	225	62	96	7302	9142	28	12436
Hancock	9175	100243	22331	227	87	151	14	122	38	202				
Leicester	2510	1330	1675	230	103	251	4	182	50	152	1111	2591	38¾	1491
Lincoln	16950	104657	60658	4172	311	1400	20	758	239	73	5085	7523	16	6280
Middlebury	3705	5174	16600	185	657	1301	2	711	326	541				
Monkton	2882	7087	11270	335	379	1586		603	187	26				
New Haven														
Orwell	*12591	*8575	*1875	*1804	*391	*1590	*7	*809	*389	*1324				
Panton	1005	140	31	75	279	812	0	372	111	369				
Ripton	5726	4915	1800	252	123	234	10	162	55	86	2083½	3968		19170
Salisbury	2290	1200	200	275	154	450	2	192	83	90	*1845	*1635	*366	*1190
Shoreham	2550	3440	500	864	580	1610	2	651	348	1348				

Starksboro	30490	64840	69060	6593	436	1673	12	380	337	53	7897	7821	312	9195
Vergennes	210				150	262	0	88	36		844	456	24	31
Waltham	800	565	700	0	182	634	0	213	83	74	2484	2036	32	956
Weybridge														
Whiting	*2120	*60	*0	*11	197	523		241	122	607				
TOTAL	120863	346201	221000	18481	6076	17798	117	8996	3768	8326	34505 1/4	42832	865	62646 1/2

*From returns of 1916.

BENNINGTON COUNTY.

Arlington	2060	2925	459	1225	291	418	2	240	88	572	3602 3/4	4468 1/2	32 1/2	8887
Bennington	*1950	*2760	*150	*933	626	825	4	428	237	1031				
Dorset	16120	25408	1040	7284	120	672	2	117	76	40	692	936	141	326
Glastenbury	612	1100	475	270	24	9	6	10	4	0	149	161	10	6716
Landgrove	9535	5185	925	875	60	138	12	124	28	22				
Manchester	20798	16946	3550	4827	476	810	5	287	108	187	769	1144	32	1493
Peru	37035	8775	750	1914	96	145	10	138	53	57	*7816	*8922 1/2	*566	*9268 1/2
Pownal	3770	5095	1245	1695	421	1007	2	640	218	713				
Readsboro	*14650	*7000	*0	*2565	*150	*206	*22	*127	*63	*66				
Rupert	16100	43785	300	9941	333	1571	0	544	131	426	3717 3/4	6213	125 1/2	16561
Sandgate	22090	7091	644	1808	129	312	12	117	57	456	370	639	21	11155
Seabrook	7050	2900	0	750	72	31	6	32	21	15	1536	830	12 1/2	141 1/2
Shaftsbury	1070	690	*0	275	105	140	*6	58	19	57				
Stamford														
Sunderland	*1225	2525	*175	*465	101	195	6	76	35	286	1906	1603 1/2	8	25833 1/2
Winhall	11910	8050	5045	1507	115	292	5	534	41	58	1166	1610	32	2354
Woodford	0	0	0	0	46	35	8	27	4	0	858	674	0	21933
TOTAL	166865	140235	14758	36334	3165	6806	108	3499	1181	3976	22582 1/2	27201 1/2	980 1/2	104668 1/2

*From returns of 1916.

CALEDONIA COUNTY.

TOWNS	No. of maple trees avail- able and not tapped.	No. of maple trees tapped.	No. of pounds of maple sugar made.	No. of gallons of maple syrup made.	No. of horses.	No. of milch cows.	No. of oxen.	No. of other neat stock.	No. of swine.	No. of sheep.	No. of acres of tillage land.	No. of acres of pasture land.	No. of acres of orchard land.	No. of acres of forest or wood land.
Barnet	49827	26482	37568	726	802	1737	6	1353	55	512				
Burke	*6700	*41420	*46255	*170	343	854	14	574	72	337				
Danville	30340	34822	47930	1221	453	1485	14	886	161	416				
Groton	3725	11450	19100	121	74	340	6	204	7	74	1029	2949		1122
Hardwick	14900	52905	78950	70	557	1535	12	1222	139	535				
Kirby	21200	27480	34800	5347	179	729	12	460	223	124	2659	4050	55	†2928
Lyndon	35000	68000	66549	543	538	1490	24	947	481	513	6284	10964	63	2666
Newark	*8675	*28655	*42550	*550	*219	*573	*6	*374	*117	*136				
Peacham	*23530	*43115	*95650	*465	338	1361	12	940	40	365				
Ryegate	29280	22124	27533	1575	460	1703	6	1211	138	414				
St. Johnsbury	21301	23887	30505	847	734	1329	6	1173	249	286				
Sheffield	25700	58600	34800	*0	235	842	15	591	107	130	*3564	*4814		*4176
Stannard	8400	15900	48050	*27	115	240	4	280	101	68	1312	2685	22	3418
Sutton														
Walden	31750	34800	62650		349	1276	16	536	129	162				
Waterford					372	1133	16	1007	102	270				
Wheelock	*87750	*41925	*54550	*0	314	581	20	467	115	101				
TOTAL	398078	531565	727440	11662	6082	17208	189	12225	2236	4443	14848	25462	140	14310

†Does not include forest land owned by lumber companies.

*From returns of 1916.

CHITTENDEN COUNTY.

Bolton	5774	4317	500	860	99	443	8	163	4	44	2536	4655	1	17358
Burlington					771	402		78	23	45				
Charlotte	1784	820	1020	83	525	1658	0	1274	262	334				
Colchester	8056	2400	620	550	819	1766		660	40	287				
Essex	6460	24535	0	5945	666	2044	10	814	68	715				
Hinesburg	28325	22829	31085	4473	560	1912	*0	659	149	208	7735	8790	67	2556
Huntington	18390	31330			281	1459	23	447		306				
Jericho	*16630	*40115	*11275	*11012	*440	*1907	*0	*705	*63	*269				
Milton														
Richmond	*7125	*5000	*10500	*750	*450	*1760	*8	*757	*9	*135				
St. George	1125	325			44	190	2	71		35			274	100
Shelburne	11585	850	700	125	475	1317	0	560	238	351	7712	5446	357	803
S. Burlington	*425	*75	*0	*2	343	887	4	287	16	375				
Underhill	24650	65090	46185	11911	394	1854	20	719	228	369	2687	4827	44	1701
Westford	27790	63955	39075	8680	362	2265	6	687	78	449				
Williston	4400	8425		2165	468	2095		730	41	219				
TOTAL	162519	272066	140960	46556	6707	21959	81	8611	1219	4141	20670	23718	4964	22518

*From returns of 1916.

ESSEX COUNTY.

Bloomfield	13900	6300	5580	420	126	229		131	63	10				
Brighton	23100	7800	17500	700	260	595	8	337	124	67				
Brunswick	640	1900	750	300	34	83	2	280	40	90	980	640	20	10220
Canaan	17800	12150	15800	340	347	648	0	512	105	72	3414	4145	0	11265
Concord	400	13640	21500	260	136	542	0	285	75	60				
East Haven	5660	5300	4000		63	109	2	114	17	32				
Granby	5150	4975	3075	613	42	85	0	107	16	32	543	827	13	1035
Guildhall														
Lemington														
Lunenburg	14000	34000	20000	6000	338	1084	2	817	128	206	5300	7745	25	10000

ESSEX COUNTY—(Concluded.)

TOWNS	No. of maple trees avail- able and not tapped.	No. of maple trees tapped.	No. of pounds of maple sugar made.	No. of gallons of maple syrup made.	No. of horses.	No. of milch cows.	No. of oxen.	No. of other neat stock.	No. of swine.	No. of sheep.	No. of acres of tillage land.	No. of acres of pasture land.	No. of acres of orchard land.	No. of acres of forest or wood land.
Maidstone	*31000	*245Q	*2550	*60	*210	*341	*0	*154	*80	*28				18000
Norton					66	116		80	18	8				
Victory														
TOTAL	111640	88515	90755	8693	1622	3832	14	2817	666	605	10237	13357	58	50520

*From returns of 1916.

FRANKLIN COUNTY.

Bakersfield	33430	76550	71425	13070	427	1802	8	693	232	151	*1898	*2604	*18	*916
Berkshire	29010	76798	130250	14500	514	3163	*0	885	495	81				
Enosbury	12765	91040	144780	4494	638	3471	2	1019	372	13				
Fairfax	14100	32925	494	2352	858	246								
Fairfield	17400	128334	12200	40745	793	4759	1	1630	443	179				
Fletcher	*34983	*81321	*116374	*6256	*311	*1493	*22	*615	*210	*41	*3814	*6695	*18	*5820
Franklin	13870	43730	41775	5978	562	2639	2	723	536	197	5366	7659	70	4602
Georgia	7550	5100		1605	204	685	*6	289	131	143	2947	2502	105	1503
Higbgate														
Montgomery	106850	94355	49193	16331	370	2214	16	636	292	36				
Richford	23730	57630	69575	3485	182	988	10	386	154	42	2833	4105	2	3690
St. Albans City	660	175	360	35	82	27	0	15	17	0	65	26	0	0

St. Albans T.	3307	3125	853	640	621	1804	0	1079	319	167				
Sheldon	6750	29565	61660	1510	465	2667	0	787	297	63				
Swanton	865	1970	2950	1800										
TOTAL	305260	722618	700679	112801	6027	25958	67	8756	3498	1103	16923	23591	195	16531

*From returns of 1916.

*From returns of 1916.

GRAND ISLE COUNTY.

Alburgh	2550	1780	500	130	575	1090	0	463	199	257		
Grand Isle					319	963	*4		275	417		
Iale La Motte	4025				213	289		233	59	75	2868%	1656
North Hero	*500	*500	*200	*50	239	545	*0	147	134	532		335
South Hero	*1100	*600	*1000	*0	600	810	0	221	270	324	*5000	*2750
												*320
												*180
TOTAL	8175	2880	1700	180	1946	3697	4	1094	937	1605	7868%	4406
												655
												180

*From returns of 1916.

LAMOILLE COUNTY.

Belvidere	13740	16660	36250	281	104	288	6	105	81	27	1365	2872	8	17484
Cambridge	26770	86080	143250	2588	545	2555	20	969	723	64				
Eden	16050	37373	69150		353	984	2	391	169	149				
Elmore	12700	18350	30000	950	222	737	42	377	167	45	3978	7109	20	12746
Hyde Park	29135	34955	49750	2749	425	1373	15	819	255	126				
Johnson	20000	67026	90650	4245	365	1229	6	549	270	79				
Morristown	28630	42850	43630	2260	800	2362	12	1166	497	278				
Stowe	12293	49220	106550	1025	632	2451	31	896	596	325				
Waterville	*14700	*42300	*72150	*1480	*180	*388	*14	*208	*102	*79				
Wolcott	18905	34875	45500	*17079	380	1625	24	554	279	172	*4682	*6640	*45	*10640
TOTAL	192733	429689	686880	32657	4046	13972	172	6034	3139	1344	10025	16621	73	140870

*From returns of 1916.

ORANGE COUNTY.

TOWNS	No. of maple trees avail- able and not tapped.	No. of maple trees tapped.	No. of pounds of maple sugar made.	No. of gallons of maple syrup made.	No. of horses.	No. of milch cows.	No. of oxen.	No. of other neat stock.	No. of swine.	No. of sheep.	No. of acres of tillage land.	No. of acres of pasture land.	No. of acres of orchard land.	No. of acres of forest or wood land.
Bradford	39800	12385	26085.	0	494	974	26	618	241	313	3805	7560	121	9861
Brantree	23285	15228	4145.	3154	329	949	25	590	162	409				
Brookfield	34075	14925	15700	2275	494	2008	10	884	503	125				
Chelsea														
Corinth	36700	23455	52580	100	153	454	43	266	107	99	3660	4453	66	4077
Fairlee														
Newbury	18750	38280	36350	2960	624	1863	18	1469	406	802				
Orange	16880	13510	15100	1011	233	541	51	509	160	136				
Randolph	40000	29000	25000	3600	942	2943	32	1760	619	324				
Strafford	39375	20894	25335	1995	306	766	64	613	152	159				
Thetford	13575	11295	20000	593	337	941	46	637	125	331				
Topsham	70716	29570	45525	1274	383	1037	52	759	240	229				
Tunbridge	74125	38700	66975	1840	400	1142	88	901	334	410	5620	9902	94	6010
Vershire		11000	20000	215	177	415	50	342	61	219				
Washington	*97596	*15511	*24485	*1106	*294	*600	*48	*591	*235	*146	*5237	*6731†	*913¼	*6595‡
W. Fairlee	11775	9225	19000	345	144	446	38	218	67	164				
Williamstown	45550	19425	*42150	*20	504	1478	22	982	458	130				
TOTAL	532212	302903	438430	20488	5814	16557	613	11139	3870	3996	18322	28646‡	372¾	26533‡

*From returns of 1916.

ORLEANS COUNTY.

Albany	28800	120000	210100	350	420	1750	8	625	350	120	6815	10515	267	7028
Barton	32000	75000	168750	500	724	2454	6	812	393	447				
Brownington	11325	49575	87075	1032	420	1360	0	603	185	174				
Charleston	34457	87012	127820	246	377	1397	6	749	269	234				
Coventry	*4500	*30710	*33550											
Craftsbury	16425	53355	91000	160	508	2178	8	763	458	135	5961	8330	10	9744
Derby					994	2782	2	1047	379	158				
Glover	8300	85705	148430	1065	299	1354	10	618	330	308	3080	5132	23½	2946
Greensboro	39500	71525	181900	580	441	1576	6	1097	400	118				
Holland	8100	52455	90310	560	413	1469	4	554	139	113	5217	7174	34½	11467½
Irasburgh	38400	71880	140790	890	393	2306	6	738	300	266	*6704	*10207	*13	*7330
Jay	20725	31753	48355	343	158	617	6	313	109	16	2140	2863	55	10820
Lowell	21705	39434	53255	745	468	1374	0	781	242	75				
Morgan	73820	57430	102675	482	199	754	2	385	112	125	2829	3699	17½	3451
Newport	24387	40765	73850	1285	638	2468	4	689	290	235	8778	10475	48	4850
Troy														
Westfield	10000	25000	50000	500	250	1000	0	300	125	100	3000	6000		12000
Westmore	17950	12960	22970	360	150	564	2	179	64	136				

TOTAL 390394 904559 1630830 9098 6852 25403 70 10303 4145 2760 44524 64395 468½ 69816½

*From returns of 1916.

RUTLAND COUNTY.

Benson	12920	9835	295	2336	308	1113	0	830	247	1040	6330	7050	85	4236
Brandon	2075	1225	925	500	496	1079	4	606	261	142				
Castleton	*3967	*1270	*174	*630	402	1091	2	626	139	105				
Chittenden	600	3500	6950	632	220	645	2	345	132	73				
Clarendon	12475	82725	9100	4205	377	1710	4	1016	1202	375				
Danby	28400	45290	3500	14330	332	1320	8	690	148	98				
Fair Haven	2490	261	100	91	131	189	0	246	83	14	2247½	2924½	86½	1326
Hubbardton														
Ira	10320	5575	2080	1120	112	422	0	279	57	70	2121	2818	76	3000
Mendon	13355	4115	2380	840	107	302	4	118	95	17				

RUTLAND COUNTY—(Concluded.)

TOWNS	No. of maple trees avail- able and not tapped.	No. of maple trees tapped.	No. of pounds of maple sugar made.	No. of gallons of maple syrup made.	No. of horses.	No. of milch cows.	No. of oxen.	No. of other neat stock.	No. of swine.	No. of sheep.	No. of acres of tillage land.	No. of acres of pasture land.	No. of acres of orchard land.	No. of acres of forest or wood land.
Middletown	11275	20755	1200	5825	236	835	*0	367	114	111	3773	4494	231	3859
Springs														
Mount Labor	100	2390		685	42	64	5	27	3	0	716½	1230¾	16½	21896
Mount Holly	9339	8721	9800	1594	229	1218	8	256	189	17	3756	6679	16½	2882
Pawlet	9074	14950	1750	5325	199	1149	*0	394	116	94	5588	5675	97½	3464
Pittsfield	9515	12245	17200	524	130	274	15	194	58	65	1719	3428		7188
Pittsford	5100	3950	3000	500	725	1370	16	1361	311	348	5100	6056	20	3660
Poultney	5015	8070	782	3576	352	1415	0	620	212	92	1076	7210	156	3000
Proctor	500	450	300	40	148	239	0	112	44	0				
Rutland City					580	471	*2	*15	109	200				
Rutland Town														
Sherburne	5515	6350	5200	1935	99	227	16	198	59	88	1081	1125	47½	3973
Shrewsbury	19430	29595	14900	6366	241	985	2	447	200	96	3840	7187	64	1926
Sudbury	4927	3455	2570	705	241	657		395	168	941				
Tinmouth	29550	15170	1800	3400	218	875	6	475	75	26	4777	5862	82	7604
Wallingford	27650	19480	1640	6290	265	1163	5	487	153	136	2476	7889	150	10564
Wells	8125	3680	0	909	133	613	0	209	50	49	2897	3169	29	3453
West Haven	3789	2120	165	377	208	849	0	433	184	861	*3003	5882	33	6420
West Rutland														
TOTAL	235506	305177	86711	62735	6529	20275	99	10746	4409	5058	50501½	78644¼	1190½	88351

*From returns of 1916.

WASHINGTON COUNTY.

	1300	350	300	20	430	146	0	60	65	14	360	636	2	50
Barre City	9012	13950	6200	825	590	1370	16	1000	575	30				
Barre Town	15100	7370	10200	*60	396	1342	10	1077	423	107				
Berlin	13300	54725	109070	3286	498	1657	22	1510	378	200				
Cabot	49575	42590	95450	*215	480	1394	31	931	342	64				
Duxbury	16050	16175	29700	0	208	657	62	340	430	23				
E. Montpelier	22530	2386	13940	496	390	1833	26	863	629	109				
Fayston	*12100	*8800	*700	*1260	*129	*507	*28	*314	*148	*1				
Marshfield	20700	28730	54510	80	462	1242	20	842	270	283				
Middlesex	25640	19780	38750	360	1291	12	604	398	88	26				
Montpelier	4025	600	350	30	484	431	12	222	173	26				
Moretown	*25180	*24290	*30800	*611	355	976	31	812	391	27				
Northfield	31250	12050	10150	600	485	1164	35	475	350	173				
Plainfield														
Roxbury	20545	11898	8240	2240	161	496	14	575	211	173				
Waitsfield	30705	54760	84040	4315	230	840	66	638	188	41				
Warren	18630	26605	43675	1100	587	1909	42	1092	446	50				
Waterbury	16850	8415	11950	0	219	639	34	241	94	12				
Woodbury	550	1600	2450		230	468	8	375	161	19				
Worcester														
TOTAL	333042	356552	550275	15118	6704	18362	457	11971	5672	1440	15661	28023	221½	30405

*From returns of 1916.

WINDHAM COUNTY.

	7670	1610	850	572	65	167	14	126	47	11	1039	2858	17	4623
Athens	15475	8900	20485	1483	118	274	18	250	85	112	2560	4072	175	3001
Brattleboro	7175	5250	5925	2040	69	174	20	211	48	43	1118	2795	25	3424
Brookline	*10850	*36130	*6750	*5951	127	246	8	275	87	265	*1397	*3620	*0	*1987
Dover	14510	13260	4825	3430	262	576	18	526	120	39	*4177	*74	*8937	*5492
Dummerston														

WINDHAM COUNTY—(Concluded.)

TOWNS	No. of maple trees avail- able and not tapped.	No. of maple trees tapped.	No. of pounds of maple sugar made.	No. of gallons of maple syrup made.	No. of horses.	No. of milch cows.	No. of oxen.	No. of other neat stock.	No. of swine.	No. of sheep.	No. of acres of tillage land.	No. of acres of pasture land.	No. of acres of orchard land.	No. of acres of forest or wood land.
Grafton	11300	5100	4300	600	199	314	46	290	62	490	1464	2459	83	3435
Guilford	11445	17035	4950	6280	303	737	19	514	160	84				
Halifax	6050	24525	2575	8205	86	187	8	158	35	319	*1687	*2605	*259	*2134
Jamaica	9978	18790	20800	3750	215	384	14	238	70	122	3746	11270	785	13176
Londonderry	5100	25750	15142	*2150	364	683	22	448	124	192	5243	7476	130	9730
Marlboro	10650	16080	4000	3486	123	225	18	233	59	218				
Newfane	3300	8575	1615	1770	47	107	10	120	40	29				
Putney														
Rockingham	8560	9235	7947	3440	471	735	22	802	135	378				
Somerset	3500				79	2	*2	1	30	5	275	150		15331
Stratton	6555	2470	1125	100	36	32	4	49	6		1054	10764	64	115577
Townshend														
Vernon	710	690	150	110	181	554	0	288	75	26				
Wardsboro	17995	22358	2625	4588	129	226	18	246	72	109				
Westminster	4050	11670	5650	5705	372	857	10	623	103	426				
Whitingham	38412	32960	450	10990	303	651	28	553	139	332				
Wilmington	24975	60675	200	21782	394	801	40	724	152	648	2900	7000	700	12000
Windham	14200	14505	1880	2357	148	262	13	206	77	120				
TOTAL	232458	335568	112244	88769	4091	8194	352	6881	1716	3968	26660	454554	111174	189910

*From returns of 1916.

SUMMARY BY COUNTIES.

TOWNS	No. of maple trees avail- able and not tapped.	No. of maple trees tapped.	No. of pounds of maple sugar made.	No. of gallons of maple syrup made.	No. of horses.	No. of milch cows.	No. of oxen.	No. of other neat stock.	No. of swine.	No. of sheep.	No. of acres of tillage land.	No. of acres of pasture land.	No. of acres of orchard land.	No. of acres of forest or wood land.
Addison	129863	346201	221000	18481	6076	17798	117	8996	3768	8326	34505¼	42832	865	62646½
Bennington	166865	140235	14758	36334	3165	6906	108	3499	1181	3976	22582½	27201½	980½	104668½
Caledonia	398078	531565	727440	11662	6082	17208	189	12225	4443	2236	14848	25462	140	14310
Chittenden	182519	272066	140960	46556	6707	21959	81	8611	4141	1219	20670	23718	496½	22518
Essex	111640	88515	90755	8693	1622	3832	14	2817	666	605	10237	13357	58	50520
Franklin	305260	722618	700679	112801	6027	25958	67	8756	3498	1103	16923	23591	195	16531
Grand Isle	8175	2880	1700	180	1946	3697	4	1064	937	1605	7888¾	4406	655	180
Lamoille	192733	429689	686880	32657	4046	13972	172	6034	3139	1344	10025	16621	73¼	40870½
Orange	532212	302903	438430	20488	5814	16557	613	11139	3870	3996	18322	28646½	372¾	26533½
Orleans	390394	904559	1630830	9098	6852	25403	70	10303	4145	2760	44524	64395	468½	69816½
Rutland	235506	305177	86711	62735	6529	20275	99	10746	4409	5058	50501¼	78644¼	1190¼	88351
Washington	333042	356552	550275	15118	6704	18362	457	11971	5672	1440	15661	28023	221¼	30405
Windham	232458	335568	112244	88769	4091	8194	352	6881	1716	3968	26660	45455	11117	189910
Windsor	333490	219055	209394	38488	6181	13141	603	9720	3753	4362	23027	52998	462¼	43149
TOTAL	3532235	4957583	5612796	502060	71842	213162	2946	112762	45338	41998	316354½	473350¾	17296	760409¼
Corrections for missing towns based on reports of other years														
				22957				17514		5063				
Total with corrections														
				236119				130276		47061				

1918 LISTERS' CENSUS COMPILED BY SECRETARY OF STATE.

ADDISON COUNTY.

TOWNS.	Total No. of Silos.	Total No. of Horses.	Total No. of Milch Cows.	Total No. of Registered Neat Stock.	Total No. of Pure Bred Bulls.	Total No. of Hogs.	Total No. of Other Stock.
Addison.....	48	513	1617		23	422	1101
Bridport.....	48	433	1491			401	1092
Bristol.....	45	420	926			386	811
Cornwall.....	61	269	904		23	183	546
Ferrisburg.....	33	329	1013	55	1	141	1080
Goshen.....	6	75	193	0	0	55	163
Granville.....	25	102	283	0	1	57	91
Hancock.....	11	76	169	6	5	41	139
Leicester.....	29	161	464	1	7	137	335
Lincoln.....	51	355	1227	15	10	275	655
*Middlebury.....							
Monkton.....	30	403	1764		16	210	918
New Haven.....	120	474	2371		75	196	740
Orwell.....	62	373	1741	35	23	372	1307
Panton.....	32	239	736	27	13	88	341
Ripton.....	4	100	263	0	0	53	257
Salisbury.....	36	274	885	61	26	183	330
Shoreham.....	44	530	1965	30	15	450	2339

ADDISON COUNTY—(Concluded.)

TOWNS.

	Total No. of Silos.	Total No. of Horses.	Total No. of Milch Cows.	Total No. of Registered Neat Stock.	Total No. of Pure Bred Bulls.	Total No. of Hogs.	Total No. of Other Stock.
Starksboro.....	48	332	1644		4	241	4912
Vergennes.....	4	134	246			41	75
Waltham.....	32	153	587	31	19	69	399
*Weybridge.....							
Whiting.....	24	216	340	6	3	142	1103
TOTALS.....	783	5961	20829	267	264	4143	18734

*No abstract returned.

BENNINGTON COUNTY.

Arlington.....	11	242	465	5	2	94	706
Bennington.....	45	530	817	68	13	88	261
Dorset.....	16	152	641	3	11	87	303
Glastenbury.....	0	25	13	0	0	3	7
Landgrove.....	1	50	97		2	30	122
Manchester.....	15	360	659	8	16	215	381
Peru.....	3	110	128			58	124
Pownal.....	39	268	817	160	16	156	796
Readsboro.....	1	155	240	4		78	145

Rupert.....	60	340	1496	16	10	138	1041
Sandgate.....	13	153	293			58	603
Searsburg.....	0	57	33	20	2	31	55
*Shaftsbury.....							
Stamford.....	10	116	308	17	8	25	199
*Sunderland.....							
Winhall.....	8	111	266	2	10	63	199
Woodford.....		40	42		2	7	8
TOTALS.....	222	2709	6315	307	92	1131	74950

*No abstract returned.

CALEDONIA COUNTY.

Barnet.....	84	383	1929	46	54	359	1126
Burke.....	6	360	829	20	25	463	1114
Danville.....	48	723	2214	250	53	616	1568
Groton.....	37	196	784	27	9	189	607
Hardwick.....	60	573	1781	103		500	837
Kirby.....	27	225	769	33	20	141	787
Lyndon.....		1233	939			168	1260
*Newark.....							
Peacham.....	59	347	1270	26	44	332	981
Ryegate.....	72	394	1556	39	96	307	1148
St. Johnsbury.....	33	807	1506			397	1163
Sheffield.....	28	335	823	40	17	144	794
Stannard.....	14	114	315	6	9	73	230
Sutton.....	14	111	374	2	4	73	293
Walden.....	28	375	1110	37	21	221	543
Waterford.....	39	271	1039	110	36	185	1069
Wheelock.....	3	270	587	18	19	128	406
TOTALS.....	552	6717	17825	757	407	4296	13925

*No abstract returned.

CHITTENDEN COUNTY.

TOWNS.	Total No. of Silos.	Total No. of Horses.	Total No. of Milch Cows.	Total No. of Registered Neat Stock.	Total No. of Pure Bred Bulls.	Total No. of Hogs.	Total No. of Other Stock.
Bolton.....	12	99	443	21	7	44	105
*Burlington.....							
Charlotte.....	125	675	1926	40	10	424	1813
Colchester.....	22	414	1369	12	11	323	807
Essex.....	72	605	2199	68	61	492	844
Hinesburgh.....	69	346	1811	8	9	110	629
Huntington.....	31	282	1391	0	5	262	552
Jericho.....	89	458	2113		8	162	645
Milton.....	31	221	967	39	13	93	318
Richmond.....	50	352	2786	46	2	76	887
St. George.....	7	43	189			26	106
Shelburne.....	49	4691	1419	60	32	239	876
South Burlington.....	37	187	716	40	27	89	297
Underhill.....	25	387	1785	19	8	310	795
*Westford.....							
*Williston.....							
TOTALS.....	619	4538	19114	353	193	2650	8674

*No abtract returned.

ESSEX COUNTY.

Bloomfield.....	8	177	274		3	28	204
Brighton.....	0	350	745	4	3	139	414
Brunswick.....	2	51	84	0	0	19	119
Canaan.....	3	338	693		3	113	328
Concord.....	28	470	1138	338	51	155	506
East Haven.....	0	76	208	0	2	25	136
Granby.....	5	45	78	0	8	50	77
Guildhall.....	10	224	414	10	10	114	321
Lemington.....	9	66	202	2	3	25	246
Lunenburg.....	18	308	1056	41	19	151	751
*Maidstone.....							
Norton.....	2	117	259		2	28	226
Victory.....	3	58	164			18	106
TOTALS.....	88	2280	5313	395	104	865	3434

*No abstract returned.

FRANKLIN COUNTY.

Bakersfield.....	23	456	1920		20	221	923
Berkshire.....	47	406	2807	57	54	300	774
Enosburg.....	52	608	3590	73		553	998
*Fairfax.....							
Fairfield.....	49	390	3124	64	43	350	341
Fletcher.....	17	343	1394		5	281	680
Franklin.....	35	581	2525		20	573	755
Georgia.....	54	361	1399		28	160	518
Higheate.....	46	367	1232	24	14	367	19
Montgomery.....	52	284	1576	10	16	292	462
Richford.....	25	244	1164	5	4	169	234
St. Albans, City of.....	0	84	36	0	0	115	0
St. Albans, Town of.....	64	492	1337	30	28	234	525

FRANKLIN COUNTY—(Concluded.)

TOWNS.					
	Total No. of Silos.	Total No. of Horses.	Total No. of Registered Neat Stock.	Total No. of Pure Bred Bulls.	Total No. of Hogs.
Sheldon.....	44	427	2481	50	321
Swanton.....	90	567	1886	81	317
TOTALS	598	5610	26471	394	4253

*No abstract returned.

GRAND ISLE COUNTY.

Alburgh.....	30	546	1256	0	3	228	549
Grand Isle.....	47	302	934	0	19	250	696
Isle La Motte.....	5	213	289			59	318
North Hero.....	23	256	565	57	6	81	567
South Hero.....	52	324	663	26	20	204	773
TOTALS.....	157	1641	3707	83	48	822	2903

LAMOILLE COUNTY.

Belvidere.....	9	96	274	0	0	72	165
Cambridge.....	73	572	2715	91	74	705	974
Eden.....		303	939			196	554
Elmore.....	36	203	728		6	148	635
Hyde Park.....	23	483	1283	46	17	281	946
Johnson.....	68	338	1162	58	18	257	600
Morristown.....	108	786	2576	171	69	456	1517
Stowe.....	50	608	2564	70	11	421	977
Waterville.....	15	99	338			84	168
Wolcott.....	35	348	1006	7	5	263	1053
TOTALS.....	420	3836	13585	443	200	2883	7589

ORANGE COUNTY.

Bradford.....	75	471	1008	31	14	314	1102
Braintree.....	74	279	1051	19	19	149	289
Brookfield.....	150	487	1874	6	17	458	1101
Chelsea.....	86	307	791	10	19	301	732
Corinth.....	36	258	605	9	12	156	441
*Fairlee.....							
Newbury.....	106	637	1970	160	61	382	2493
Orange.....	36	243	635	55	17	168	521
Randolph.....	233	899	2833	250	20	653	2355
Strafford.....	51	294	829	4	13	192	695
Thetford.....	38	360	977	244	10	136	599
Topsam.....	35	386	1078	76	10	224	858
Tunbridge.....	142	439	1267	35	27	445	1095
Vershire.....	23	137	360		5	79	401
Washington.....	27	268	533	17	9	195	619
West Fairlee.....	19	168	461	5	7	58	527
Williamstown.....	74	540	1431		49	365	927
TOTALS.....	1205	6173	17703	921	309	4275	14755

*No abstract returned.

ORLEANS COUNTY.

TOWNS.

	Total No. of Silos.	Total No. of Horses.	Total No. of Milch Cows.	Total No. of Registered Neat Stock.	Total No. of Pure Bred Bulls.	Total No. of Hogs.	Total No. of Other Stock.
Albany.....	49	350	1713	57	29	223	770
Barton.....	33	723	2213	11	26	324	1168
Brownington.....	27	429	1421			201	521
Charleston.....	38	697	1108	70	15	138	1037
Coventry.....	34	303	1456	1	2	165	910
Craftsbury.....	59	522	1838	135	20	304	1063
*Derby.....							
Glover.....	50	397	1977	136	24	298	1064
Greensboro.....	15	452	1573	257	28	407	916
Holland.....	7	291	1527	1	0	138	964
Irasburg.....	27	417	2169	85	17	287	1019
Jay.....	7	157	760	1	1	54	251
Lowell.....	25	425	1126			240	923
Morgan.....	6	202	823	1	28	79	504
Newport, City of.....	13	368	362		2	92	184
Newport, Town of.....	37	315	2642		1	180	865
Troy.....	26	418	1924	19	10	252	650
Westfield.....	21	216	1154		6	138	383
Westmore.....	5	137	513	21	11	59	297
TOTALS.....	479	6819	26299	795	220	3559	13489

*No abstract returned.

RUTLAND COUNTY.

Benson.....	54	298	1329	13	7	162	843
Brandon.....	37	480	1217	69	20	171	984
Castleton.....	30	316	853	0	41	147	554
Chittenden.....	222	186	589			96	340
Clarendon.....	37	240	980	124	18	131	677
Danby.....	41	320	1280	10	2	134	648
Fair Haven.....	23	199	498	15	11	48	97
Hubbardton.....	31	144	443	12	11	108	498
Ira.....	9	133	418	13	17	110	211
Mendon.....	16	99	223		17	64	176
Middletown Springs.....	20	259	792	405	54	123	170
Mount Holly.....	17	302	1236	177	38	160	296
Mount Tabor.....		39	97	0	0	9	0
Pawlet.....	83	290	1931	177	65	208	525
Pittsfield.....	29	93	253		2	49	245
Pittsford.....	108	340	2090	108	61	633	1230
Poultney.....	50	360	1465	40	20	220	650
Proctor.....	6	131	264	59	7	42	113
Rutland City.....		438	363		8	148	370
Rutland Town.....	51	317	1065	57	35	185	818
Sherburne.....	23	129	262		4	81	402
Shrewsbury.....	61	244	1150	79	37	146	547
Sudbury.....	31	227	690	5	23	187	1246
Tinmouth.....	16	217	996	127	12	125	491
Wallingford.....	18	262	1194	11	16	185	624
Wells.....	29	130	572	13	7	54	193
West Haven.....	27	197	872	18	4	158	1327
West Rutland.....	16	227	667	92	8	131	364
TOTALS.....	885	6617	23789	1624	545	4065	14639

WASHINGTON COUNTY.

TOWNS.

	Total No. of Silos.	Total No. of Horses.	Total No. of Milch Cows.	Total No. of Registered Neat Stock.	Total No. of Pure Bred Bulls.	Total No. of Hogs.	Total No. of Other Stock.
Barre City.....	1	367	150	8	1	67	35
Barre Town.....	62	312	1273	205	36	302	330
Berlin.....	42	398	1433	34	39	304	1011
Cabot.....	54	475	1565	125	42	509	1755
Calais.....	81	356	1494	136	37	339	732
Duxbury.....	41	216	661	3	3	345	436
East Montpelier.....	97	372	1634	40	32	529	931
Fayston.....	18	208	483	5	5	121	317
Marshfield.....	77	352	1324	200	17	249	1080
Middlesex.....	60	310	1184	58	16	421	714
Montpelier.....	8	384	449	38	7	184	201
Moretown.....	59	367	1118	39	31	322	796
Northfield.....	52	344	919	44	42	247	581
Plainfield.....	39	240	616	6	3	188	751
Roxbury.....	39	264	625		1	152	418
Waitsfield.....	58	215	835	38	38	233	964
Warren.....	52	248	804	24	20	160	542
Waterbury.....	57	530	1650	79	15	354	1059
Woodbury.....	18	221	621	29	9	89	323
Worcester.....	8	231	685	0	4	228	274
TOTALS.....	923	6410	19523	1111	398	5343	13250

WINDHAM COUNTY.

Athens.....	14	54	173	105	9	33	164
Brattleboro.....	36	304	819	16	25	194	583
Brookline.....	21	68	167	2	8	65	263
Dover.....	7	129	258	2	2	59	325
Dummerston.....	37	242	640	113	26	240	504
Grafton.....	16	125	282		6	77	300
Guilford.....	53	296	785	9	18	174	709
Halifax.....	33	202	454		2	107	442
*Jamaica.....							
Londonderry.....	32	323	745	63	33	184	488
Marlboro.....	21	19	244	14	7	61	455
Newfane.....	33	163	363	11	13	98	486
Putney.....	44	177	542	150	10	55	642
Rockingham.....	33	442	754	207	9	212	987
Somerset.....		68	2	1		30	
Stratton.....		38	28	0	1	10	38
Townshend.....		261	595			117	699
Vernon.....	50	157	557	108	20	128	214
Wardsboro.....	19	112	231	7	5	67	316
*Westminster.....							
Whitingham.....	39	304	737	73	19	142	796
Wilmington.....	28	369	842	54	22	185	432
Windham.....	13	124	211	98	2	68	4
TOTALS.....	529	4077	9429	1031	237	2306	8847

*No abstract returned.

WINDSOR COUNTY.

Andover.....		166	464			107	231
Baltimore.....	5	30	78	2	1	23	64
Barnard.....	73	910	1012	70	5	630	875
Bethel.....	90	337	977	36	15	185	465

WINDSOR COUNTY—(Concluded.)

TOWNS.

	Total No. of Silos.	Total No. of Horses.	Total No. of Milch Cows.	Total No. of Registered Neat Stock.	Total No. of Pure Bred Bulls.	Total No. of Hogs.	Total No. of Other Stock.
Bridgewater.....	27	198	365		12	91	649
Cavendish.....	18	194	440			109	426
Chester.....	7	487	922	0	12	237	1159
*Hartford.....							
*Hartland.....							
*Ludlow.....							
Norwich.....	58	437	992	15	22	174	596
Plymouth.....	8	122	323	19	5	92	224
Pomfret.....	68	274	640	431	46	228	976
*Reading.....							
Rochester.....	77	304	772	23	13	221	606
Royalton.....	94	471	1191	35	11	419	1233
Sharon.....	51	244	647	39	11	172	539
Springfield.....	96	723	1396			353	1231
*Stockbridge.....							
*Weathersfield.....							
Weston.....	19	164	465	1	8	112	418
*West Windsor.....							
Windsor.....	23	290	464	173	16	157	275
Woodstock.....	49	676	1351	31	17	316	1527
TOTALS.....	763	6027	12499	875	194	3626	11494

*No abstract filed.

SUMMARY BY COUNTIES.

Addison.....	783	5961	20829	267	264	4143	18734
Bennington.....	222	2709	6315	307	92	1131	4950
Caledonia.....	552	6717	17825	757	407	4296	13925
Chittenden.....	619	4538	19114	353	193	2650	8674
Essex.....	88	2280	5313	395	104	865	3434
Franklin.....	598	5610	26471	394	270	4253	7734
Grand Isle.....	157	1641	3707	83	48	822	2903
Lamoille.....	420	3836	13585	443	200	2883	7589
Orange.....	1205	6173	17703	921	309	4275	14755
Orleans.....	479	6819	26299	795	220	3559	13489
Rutland.....	885	6617	23789	1624	545	4065	14639
Washington.....	923	6410	19523	1111	398	5343	13250
Windham.....	529	4077	9429	1031	237	2306	8847
Windsor.....	763	6027	12499	875	194	3626	11494
TOTALS.....	8223	69415	222401	9356	3481	44217	144417
Corrections for missing towns based on reports of other years.....			19751				10070
Total with corrections.....			242152				154487

FOURTEENTH ANNUAL REPORT
of the
VERMONT STATE
Horticultural Society
(New England Fruit Show Number)



PROCEEDINGS
of the
Twentieth Annual Meeting and Exhibition
Held at Montpelier
November 14th to 18th, 1916.



Printed by
The St. Albans Messenger Co.
St. Albans, Vt.

LETTER OF TRANSMITTAL.

To His Excellency, H. F. Graham, Governor of Vermont:

Dear Sir: In accordance with the requirements of the Vermont law, I have the honor to transmit to you the Fourteenth Annual Report of the Vermont State Horticultural Society.

Respectfully submitted,

M. B. CUMMINGS,

Secretary.

January 6, 1917,
Burlington, Vt.

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E. H. WEST.....Dorset

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OPENING REMARKS.

**HON. J. LEWIS ELLSWORTH, WORCESTER, MASS., PRESIDENT
OF THE NEW ENGLAND FRUIT SHOW.**

Ladies and Gentlemen: It becomes my very pleasant duty as President of the New England Fruit Show to call you to order and to introduce the speakers.

I have but a brief word to say. The New England Fruit Show was organized in Boston in 1909. It has held in Massachusetts four different fruit shows, and in the other New England States,—with the exception of Connecticut, it met on alternate years. There has been a show in Maine, New Hampshire and Rhode Island in addition to those that have been held in Boston. This year for the first time we meet in Vermont.

The object of organizing and carrying on the New England Fruit Show has been to encourage the raising of better fruit. I may say in behalf of the officers of the New England Fruit Show and its members that they are very much gratified at the increased value of the fruit raised in New England, both in its production and in its quality, and in the manner of packing, and for that we attribute a great deal to the organization, the lectures and the exhibitions that have been held. I am sure Vermont is to be congratulated on taking hold of this show and on making this beautiful exhibit.

It is my pleasure to introduce to you the Governor of your state and I want to say that at the first New England Fruit Show held in Boston I had the pleasure of introducing the late Governor Draper, who gave a brief address. He became so enthused over the apple outlook that he went home and the next year he planted out an apple orchard.

WELCOME BY THE GOVERNOR.

HON. CHARLES W. GATES, FRANKLIN.

Ladies and Gentlemen: Four weeks ago today I spent the whole day in Springfield, Massachusetts, looking over that wonderful exhibition at the National Dairy Show. Any one who would go to that show and not get some help from looking over those wonderful specimens of cattle, and other things that they had there, certainly would be lacking in some of the qualities which we believe belong to the men and women of New England. To see those beautiful Jerseys, Holsteins, Ayrshires and Guernseys was enough to inspire any one who loved rural life, to go home and make better use of his opportunities. I know we in Vermont came home with that idea. In Vermont we have climate, land and opportunity for developing herds of cattle that will be talked of all over New England and all over the United States, if we would only improve the opportunities which we have. The business men and others who took hold of that exhibition and got the National Dairy Show to Springfield did a splendid thing for New England. They have started what I believe will result in much good to our farming interests. Here in Montpelier today you are opening another show along another entirely different line but one that is intensely interesting to a great many of us and one that has just as large opportunities in a way as that represented by the large Springfield Show and I think that the business men of Montpelier and those who are responsible for bringing the New England Fruit Show here are to be congratulated that they were fortunate enough to get the two exhibitions,—the Vermont society and the Fruit Show, to come together here to interest people in fruit farming, and other lines and I believe that you have started here what will be of great interest to the State of Vermont.

We certainly are going to make the most of this opportunity and I am not sure but that I will get enthused enough so that I will go back and set out new orchards. I set out twelve trees last year. I planted them because our trees were so poor that we have been buying apples for our own use for several years and I thought we ought to raise our own fruit. Seriously, we have a climate that develops in our men and women characteristics that we are proud of, and our apples have a flavor that we are proud of. If you

doubt it take the apples from several of our locations here in Vermont, and especially in Grand Isle, I am not so sure that the apples are so much better there, but they are talked about more. I have had several barrels of those apples and I never tasted anything like them. I have had apples from all through the West and even from Massachusetts and I don't find anything that is any better and nothing quite as good as the beautiful Red Mackintosh and the Northern Spy that are raised in Grand Isle and what can be done there, can be done in many of our towns.

In our little town of Franklin away up on the northern border there is an old wood lot that was cut off by the lumbermen several years ago and was bought for a song by one of the leading business men of Franklin County who saw the opportunities for fruit growing and he set out that whole acreage with Mackintosh Red and Snow apple trees. This year they harvested seventeen carloads from that old orchard. It never has been plowed and there has been very little cultivation among the trees. You scientific fruit growers would laugh at any one trying to raise apples in that way in the northern end of the state, but this orchard proves that it can be done. They have the modern way of barreling the apples and each barrel and box is marked and sent to New York City. This illustrates what can be done by those who will see the opportunities and grasp them. Such opportunities lie all around us here in Vermont. Hundreds and hundreds of acres that are growing up to weeds or White Birch or something that is worse could be utilized for fruit.

Coming down on the train this afternoon I was impressed at Essex Junction by a crowd of young fellows, an army of hunters, getting on to the train with their guns. It struck me as a very peculiar situation that Vermont with its agricultural interests, with its county advisors, with the work that is being done by the agricultural colleges and by our state commissioner of agriculture trying to develop the farming interests of Vermont, and especially all fruit growing interests, and I coming to a fruit show here that was intended to be the crowning feature of inspiration into the hearts and minds of the farmers to set out apple trees, while these hunters were going out to hunt the deer that the State is protecting and eating these trees that some of the farmers are setting out. It occurred to me that it was trying to ride two horses at once and that some where some body would get a fall. I suppose there is a way to handle this matter and get along with our orchards, and develop them, and not have them all destroyed, but it does seem that our

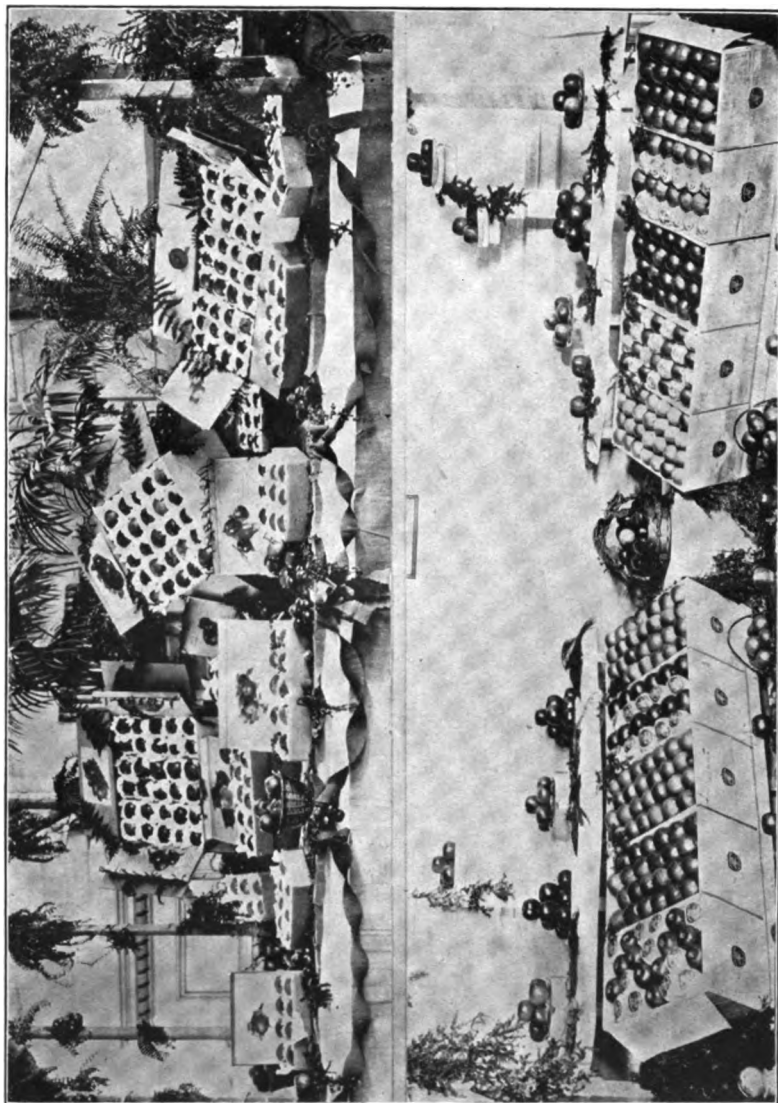
orchards and our fruit ought to come first as an interest of the state and that we ought at least to make our laws such that while hunters may have their fun, and we may have an opportunity to see these beautiful creatures once in a while, at the same time we ought to be able to defend ourselves and to plant and develop our orchards in the very best and most liberal way.

I want to extend a word to you who are present from outside of Vermont. We feel proud to be able to welcome you to our little Green Mountain State. We are glad to have you come; we are glad to have this Fruit Show combined with our own efforts along this line and we hope to make it pleasant for you.

I want to congratulate the Vermont Association on being able to combine with this Fruit Show and it seems to me it is one of the most helpful things you can do to stimulate a greater interest in doing what we can easily do on most of our farms if we would only attempt it right and I promise you who are from away that we are going to get our full share of this opportunity if it is a possible thing because the Yankees in Vermont are inclined to do that, even in horse trades.

I had a talk with a man who was buying and selling apples in a grocery store right here in this very city only a week ago and I asked him the price of the apples and he said he was paying fifty cents a bushel for St. Lawrence apples. I asked him if that wasn't rather cheap and he said it was, but that he had offered to pay the old man who brought them in a dollar a bushel if he would sort them and grade them, but the old man said he hadn't time to bother with them and so he just put them in a bag all together and brought them in to him.

In making a success of this or any other department of agriculture we must be willing to work, and if we go into it one of the first things we must learn is that it requires careful attention and work, and that is the price of success not only in fruit growing, but in any other occupation.



FROM NEW ENGLAND FRUIT SHOW, MONTEPELIER, VT.
ABOVE, ATTRACTIVE USE OF CARTONS. BELOW, ATTRACTIVE USE OF BOXES.

WELCOME BY MONTPELIER.

HON. JAMES B. ESTEE.

Mr. Chairman, Ladies and Gentlemen: I always appear before my neighbors and the citizens of Montpelier with a little feeling of fear and trembling when I am charged with the responsibility which your Chairman and the President of the New England Fruit Show has stated is my pleasant duty at this moment; that of welcoming the strangers, lest for any reason I should forget or fail to amply express the full measure of Montpelier's habitual welcome to our guests.

I was talking this afternoon with five men who through their experience in fruit matters are competent to judge of such things, and they informed me that this exhibit of fruit presented here tonight in point of volume and in matter of quality is the best that has ever been assembled within the boundaries of New England, and I have no reason whatsoever to doubt the sound judgment or the correct statement of these gentlemen, and it is a distinguished honor for our city to be the place in which is held this great exhibition of New England fruit.

Now, Montpelier, Mr. President, extends her welcome through its Board of Trade to the New England Fruit Show, to the Vermont State Horticultural Society and its members, and the fruit growers throughout New England who are exhibitors here on this occasion and to all the distinguished men and women who will participate in the series of lectures which are to go along step by step in this room with the exhibition of the fruit itself and to all the visitors from outside, or from parts of the State of Vermont other than Montpelier and to all the states in New England our city bids you tonight a most cordial welcome.

Montpelier has a reputation, very justly achieved I think, through years of experience in this matter of hospitality and welcome and she is determined on this very remarkable occasion and in connection with this united exhibit of fruit to outrival her own record in this particular and I promise you that she will do it. She will fulfill every expectation and redeem every pledge in this regard.

When Mr. Cummings, the Secretary of the Horticultural Society, informed the members and officers of the Board of Trade that a very considerable sum of money must

be raised to be used in part payment of the premiums to the successful exhibitors at this show, the citizens of Montpelier, alert and public spirited and always standing as we do here, in the front trenches, upon the firing line, there was not a moment's hesitation, not a man hesitated, but as one voice they declared that the money would be quickly raised and through Mr. Conant, the Chairman of our Conventions Committee, and his associates, the money was raised and the fruit show is here. It is on now; within your vision this present moment in fulfillment of what I have stated and in fulfillment of the living faith of our merchants and business men in those things which make for the upbuilding of community life. It is a good and a great show and Montpelier is proud of it, but only a few years ago it would have been impossible to have held or assembled here in Montpelier, or in any other city in Vermont, such an exhibition of New England grown fruit as we have here tonight for two very simple reasons; in the first place there was then no united fruit show representing all of the states of New England through which and by which such an assembling of fruit could be had and then again the people of New England had not a few years ago awakened to the great opportunities here on these hillsides and in these valleys of New England for fruit growing but thanks to the clear vision of hundreds of men and women such as the President and our distinguished Governor through the foresight, and enterprise, we have in New England, are coming into our own as fruit growing region and so through this foresight and progress and in the evolution of events the New England Fruit Show is held this week in Montpelier. Montpelier, through its Board of Trade and on behalf of citizens, bids you all a cordial welcome and hope that your stay in our city may be most pleasant and enjoyable.

RESPONSE TO WELCOME.

E. H. WEST, OF DORSET.

Montpelier is noted for its hospitality, beauty and everything else worth mentioning.

The Vermont Society is celebrating its twentieth birthday in a manner extremely pleasing to its members. What we hope and expect to do in the next two or three years is to put Vermont on the horticultural map. I venture to say that nowhere in the United States could finer Mackintosh and Spies be grown than you see here but the trouble is only a few of our growers have the improved, modern and scientific methods. What we hope to do is to get every one to adopt the best and most up-to-date methods and let us hope that as a result of such a meeting as this we may make Vermont apples famous throughout the world as are Vermont maple sugar and granite. We certainly can do it. Again let me thank you in behalf of our society and through you, Mr. Chairman, the Board of Trade for this most generous and very much appreciated welcome.

REMARKS BY GEORGE D. AIKEN,

STATE VICE PRESIDENT.

My part in putting on this show has been very pleasant. We have been supported liberally by the people of Vermont and of the other states. Let me cite an illustration of what Montpelier has done for us. Let me tell you that if Boston should do as well accordingly, when we have a show there next fall we will have a premium list of fifty thousand dollars. As to what the people of Vermont have done you will only have to look around this hall. Maine has sent us some of her citizens with about a hundred plates of apples and among those hundred plates, are some of the very best apples in this hall. We offered a prize for cooked products in any of the one hundred and ninety-seven ways and Connecticut not wanting to be outdone sent us one hundred and ninety seven varieties of apples to make them of. Rhode Island is a small state but she sent us the man with his apples who has the peculiar habit of taking the

sweepstakes prizes every year. Massachusetts has sent us a good delegation of men with apples. New Hampshire has lately gained the reputation of doing the unexpected, and tomorrow you will see on exhibition here a display of fruit from the New Hampshire State College.

A few years ago, the President of our Society, Mr. Geo. W. Perry, gave us a motto. "Boom the Apple and the Apple will Boom Vermont." It was the best show we had ever had in Vermont at that time. There were something like thirty boxes and three hundred plates. We acted upon that motto and began to boom the apple and the result is seen here tonight. The apple now is booming Vermont, and not only Vermont, but the rest of New England.

MARKETING HORTICULTURAL PRODUCTS.

HON. WILFRID WHEELER, BOSTON, MASS.

This evening you have asked me to come up here to speak on a question that we in New England have got to look at very seriously within the next few years, and study our conditions a little more carefully than we have in the past, if we are going to make the agricultural conditions better.

We have been growing fine crops of various kinds all over New England; we have been growing fine quality and we have been growing large yields to the acre of many of these crops and yet you cannot travel anywhere in New England without finding any quantity of abandoned farms, or idle land, which ought to be producing something to feed the people with, and you cannot go into any of our markets, even in the middle of some of this finest soil, without finding the products of the rest of the country or of the world right in those same markets, brought two or three thousand miles, competing with the fruit products which we are raising here. We wonder why this happens. The thing that comes to my mind in this connection is this: New England men are giving too little time to the question of marketing and of handling products, after having raised them, and today the problem in agriculture in New England strikes me as being that of marketing rather than that of production.

We have seen the West capture our markets in the production and in the selling of apples. We have seen the West bring its fine apples here, and because they were put

up in a finer package, because every apple in the package was good and because behind there was an organization to say the apples were good. We must organize to produce bigger crops, and take the markets as the West has taken them. The West has forced organization upon us. We cannot afford to go along in the hit or miss way.

I wonder if many of you realize the condition that New England would be in if we were at war with the world or some two or three nations which were stronger than we, and they captured New York and the Hudson River Valley and possibly the St. Lawrence Valley. New England would be isolated. It would be starved out in about two weeks and we would have to submit to the conqueror, whoever it might be, and they need not raise a finger beyond holding those two points I have mentioned. We are bringing in so much from other parts of the world that our own little production here would hardly keep us alive for two weeks.

When we think along that line we have got to consider this question of utilizing our land, and nothing will utilize that land so quickly as showing the people here how to make a profit on that land and the whole question of making the profit, to my mind, is the production in large quantities of certain products we can produce here in a large way and marketing them through organization.

The little country of Denmark a few years ago was in a worse condition than are we in New England today. That little country had gotten down, agriculturally speaking, to the very lowest ebb. The agricultural people of that country had emigrated to this country and other parts of the world in such large numbers that they were producing very little in that country and it befell to the lot of one of their great men to go out and try to tell them what to do. It took him thirty years of constant work to impress upon the people of Denmark that their only hope of re-creating Denmark agriculturally was to organize from the production end of the business right through to the selling end, and the consequence is that in the last twenty years alone Denmark has risen from despair. Now it is exporting annually from ninety to a hundred million dollars' worth of agricultural products raised on its own soil.

Such things can be done here. We are as well fitted to do it as any other section of the country. The only thing we need is a little more faith in ourselves, and faith that we have got the soil and the other conditions that will carry this thing out as it was done in Denmark.

In Massachusetts we are producing annually fifty to sixty million dollars worth of agricultural products and we

are importing two hundred fifty million dollars' worth, all of which could be grown in that state on some of the idle land of which I have been speaking. And while Massachusetts is a thickly settled state, it has got plenty of land to produce this two hundred fifty million dollars' worth of agricultural products if it were all used, but note that Massachusetts agricultural population is only 6% of the total for the state. Our agricultural population is far too small all over New England in relation to the rest of the population. It is not a healthy condition. It is a condition that cannot prevail in a country of this sort where we are importing from one section to another and not taking care of the agriculture of any one section. I believe our first step in this great marketing question is to organize for production. I said the matter of marketing was the important one, but in order to have anything to market we must first produce it.

Our great question here is the production in certain areas of the crops that will grow best in those areas. We should find out those areas, find the undeveloped areas which might grow crops of certain kinds and the advantages of such organization in the first place would be the purchase of supplies and the growing of a uniform product. I believe that every section, no matter how small, ought to take a census of its conditions. It ought to find out what it is growing at the present time, the vacant land and what it is capable of growing. For instance, one small town discovered that it could grow potatoes better than any other crop. It grows one variety of seed potatoes, the seed coming from one source which they know is pure so that they can go out into the market and say "Here, we have got certain potatoes of a certain character at a certain price". Each town has that possibility within itself.

The Cranberry Growers Association of Massachusetts is doing precisely what I would like to see done in every line. The little cranberry grower who has but a few boxes of cranberries to sell, belongs to that association; he gets the information about handling his crop. He is told by the larger association when to look out for frosts, when to pick his crop of berries, the time to get those berries under cover, and all that; and then the big association acts as his selling agent and he gets the advantage of being in touch with a very large organization, not only in his own state, but throughout the country, because that association has branches all over the country. That little association was patterned a little after the Citrus Fruit Growers of California which does an enormous business.

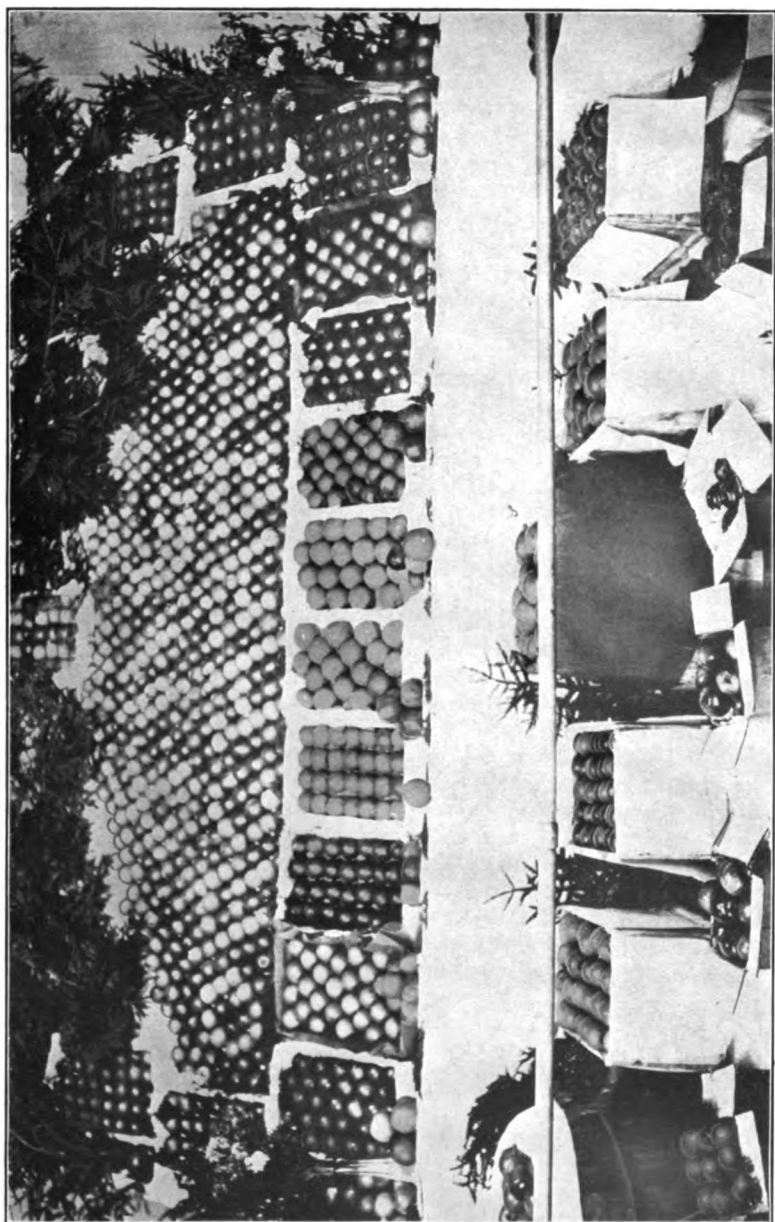
The co-operative bookkeeping question is coming up very strongly these days and I think it can be best accomplished through organization. We have had a great deal of bookkeeping done on our farms which does not mean much to the farmer. It really does not show the actual cost of production or even the business the farmer is doing.

The use of labor also is very important. I believe that in an organization, certain types of laborers can be used where they will be spread around on different farms more uniformly than the individual can do it on his own farm and I believe that if organization does nothing more than force us to co-operate in apple packing or to organize in spraying, it would be well worth the while. I believe that co-operation is very essential in the use of machinery such as tractors and grading machines and all other tools of that expensive type.

The question of disposal of our surplus by organizations is very important. I think organization is perhaps the most important question in the disposal of our surplus crop because often times in years past we have disposed of our surplus in such a way that it was an absolute waste. This surplus could be put into some by-product that we could readily manufacture on the farm. We should start factories for the disposal of our surplus crop; for preserving apples in various ways, which usually go to waste. In certain parts of Massachusetts, and this year in particular, we have quantities of waste apples.

As an example of this whole question of organization, I am going to tell you a story of an effort in Southeastern Massachusetts which this year has done remarkably well. It is known as the Cape Cod Strawberry Association and is entirely made up of Portuguese. There are about two hundred Portuguese in that town and they cultivate about four hundred acres of strawberries. It is the largest strawberry section in the United States. It is less than ten years since these Portuguese emigrants landed in the town of Falmouth and went to work for different people on their farms. They were natural farmers and they cleared some of the wild land in that section which I have been speaking about and which is very abundant in certain sections of that part of the state, which is very cheap and can be purchased for very low rates. Portuguese take small areas. They had absolutely no money to start with and so they had to buy in small lots but they gradually cleared up that land and found that strawberries would do pretty well on it without any fertilizer and with little care and so they went into the strawberry business heavily. Up to about

three years ago they were fairly successful but as more of them got in they found that the Boston market was not taking their strawberries at the prices they had been able to ship them at, and by the way, that whole section produces one variety of strawberries, and they found they weren't getting a profit. Two years ago it was an absolute loss for the strawberry growers there and a year ago this summer practically two-thirds of them were ready to give up the business, but they, like all foreigners, have a strong idea that organization and co-operation among themselves is necessary in any business and so they got together, and drew up a little form of organization and agreed to go ahead one year more and try the thing out in a different line from what they had ever done before. They appealed to our Department and we were able to help them in securing a manager. In the past they had been paying very high prices for fertilizer, crates and packages of different kinds, the hauling of goods to the market and for various things of that sort and through their manager they were able to get a big reduction on all of those things. They cut their ice bill in two. Where they had been paying something like thirty-five cents for their strawberry crates, they use a sixty quart crate there, they got them this year at twenty-eight cents; where they have been paying \$4.00 per thousand they get them for a little less than \$3.00 this year. They were able to get the commission house to handle their business as one unit for a much less rate, because where fifty or sixty men had been sending in their goods to him it required several bookkeepers to do the work of putting the business on the books, and this year there was only one name to carry and consequently less work was required. This year they faced the worst condition because their berries usually come in early but this year they came in with all the rest of Massachusetts and New Jersey so that they all came into the Boston House at one time, but the commission men were able to place a good many of the berries outside of the market in car-load lots, a method hitherto impossible.



DISPLAYS OF APPLES SHOWING STYLE OF BOX PACK AND USE OF LINING PAPER.

THE FUTURE FOR THE NEW ENGLAND APPLE GROWER.

DR. J. K. SHAW, AMHERST, MASS.

Mankind always has been and doubtless always will be curious to know the future. We consult the soothsayers, astrologers and their successors of modern times and marvel at their prophecies of the future which sometimes startle us with their seeming approximation of the truth. Those who pride themselves on their stock of common sense and level headedness, look with skepticism on such forecasts of the future and perhaps discount in advance any attempt to guess what lies before us. Nevertheless the success of any business venture depends almost wholly on a presumption of what lies before and the more accurate the presumption the greater the success.

The fruit grower is forced constantly to make a guess of what the future will bring. Shall he spray today when the weather threatens or wait for more favorable conditions on the morrow? Upon this rain fall of the coming season should doubtless depend the management of his orchard soil and when the harvest is gathered shall he accept the offer of today or wait for a better one that may come on the morrow?

Just now many apple growers are revolving in their minds a larger question of the future, which may be stated something like this: "What will be the profits of apple growing during the next ten years and what course should I pursue in order to attain the largest possible success in the business"? This question rises through the belief that large plantings of young trees during the past eight years, together with an awakened interest in caring for trees already established, means a greatly increased production and consequent low prices. We can judge the future only by the past. Let us inquire what the past history of fruit growing in America can tell of the present and future trend of the business.

To begin with we may note that apple growing on a commercial scale as we understand it is peculiarly a North American enterprise. Only in southeastern Australia and Tasmania is there even an approximation of the fruit growing industry as we know it. Of course the crop there reaches the European market at a time when it competes

with only the late stored crop of the northern hemisphere. Few apples are grown in Europe and in the reputed original home of the apple in southeastern Europe or Asia Minor the fruit is practically unknown. Neither does Europe consume large quantities of apples at the present time but who can say what the possibilities may be were the market developed by wise and active business methods.

The question then is one peculiar to North America. It is a problem for us to work out for ourselves without looking to other times or places for a solution. There are three major factors involved in this question: first, the number of newly planted trees yet to come into bearing; second, the probable increase in production due to better care of orchards; and third, the question of markets and marketing.

Taking up the first problem in 1910, there were 151 million bearing apple trees and 66 million non-bearing apple trees, something over one third as many. At first thought this seems a large proportion of young trees, yet among other fruits the numbers were roughly as follows: Peaches, 95 million bearing, 42 non bearing; pears 15 million bearing, 9 million non-bearing; plums, 23 million bearing, 7 million non-bearing; grape vines, 224 million bearing, 60 million non-bearing.

The pear most closely resembles the apple and here the proportion of non-bearing trees is much larger than in the case of apples. The normal length of life and duration of the non-bearing age is about the same with the two fruits but the wastage,—that is the number of trees that fail to reach bearing age, is probably greater with pears. The peach may be said to be of bearing age after 4 years and to last about 12 years, that is the non-bearing period is about one third the life of the tree. The apple may be said to come in bearing at about 7 or 8 years and to last 40 or 50. The duration of the non-bearing period is relatively less than in the peach which will call for fewer non-bearing trees. In a survey of Grand Isle county, Vermont in 1896 the Vermont Experiment Station found 35,000 bearing and 17,000 non-bearing trees, the proportion being considerably larger than that found in 1910. From 1910 to 1914 there were heavy plantings especially in the eastern part of the county, but since 1914 the number of young trees planted has been very small. I doubt if there are one third as many nursery apple trees in the country now as there were in 1912 and if present prices are an indication, the supply is greater than the demand. The destruction of bearing trees from 1900 to 1910 was great, the number falling off some fifty million which, however, may be due in part to the in-

clusion by enumerators of some non-bearing trees in 1900. In my judgment the proportion of 1 young to 3 bearing trees is about a normal one. How much the relative number of non-bearing trees has increased since 1910 it is impossible to say, but it is certainly no small increase. Probably it is enough to somewhat more than offset the destruction of a decade ago and we now have in some sections of the county, a somewhat excessive number of trees of non-bearing age. Nursery sales of apple trees were very great up to 1914, since when there has been a decided decline in the business.

Passing to the second question, the possibility of increased production from better orchard care it seems to me that there can be but one conclusion. The adoption of spraying almost always results in greatly increased production. While many of the orchards recently planted are in the hands of amateurs whose success is doubtful, a large proportion of them are under the care of skilled men who will handle them for maximum production of high class fruit. How great an increase from better care we are to expect and what its effect will be it is difficult to determine. As soon as prices begin to be depressed many of the less skillful growers will become discouraged and quit while others may still carry on the business at a profit.

Looking at the actual production of apples during the last 25 years as given by the Bureau of Crop Estimates of the Department of Agriculture taken by four year periods we have results as follows:

1889-92	45,000,000	barrels
1893-96	58,000,000	"
1897-00	55,000,000	"
1901-04	65,000,000	"
1905-08	52,000,000	"
1909-12	61,000,000	"
1913-16	69,000,000	"

It seems to me that these figures show one of the reasons for recent stimulation of interest in apple growing. The period 1905-1908 saw a sharp drop in production. Had the period fallen so as to include the years 1907-1910 the average crop would have been less than 47 million barrels and in no one of the four years did the crop go far above 50 million barrels. As a result of these four crops the price in Boston in 1910 reached the high figures of \$4.50 to \$6.00 per barrel. In addition to this the far western growers were improving this opportunity of low production and high prices to get a foot hold in the eastern markets. Is it

any wonder that the east experienced a revival of interest in orcharding!

It is reasonable to expect that the trees planted between 1907 and 1914 are now coming into bearing and will continue to begin and increase in production during the next fifteen years. While I do not believe that these plantings are so excessive as some would have us believe, yet taking this in connection with better care I am convinced that the next ten years will see several apple crops larger than any previously gathered. The result of a large crop and consequent low prices will result in discouragement of some growers who will relax their efforts, thus lessening production and tending to restore higher prices. As before indicated I believe this to be a more significant factor in determining the trend of the apple business than plantings of young trees.

Thus far we have been considering the whole United States, but to get the real significance of the trend in production we must analyze the problem and see what the tendency is in various sections of the country. The principal markets are in the states bordering on the Atlantic coast, and if these states can produce and market apples as cheaply as those at a distance to the west they are at an advantage on account of nearness to market.

According to census figures the heaviest plantings have been in certain of the far western states in many of which the number of young trees was greater than the number of bearing trees. The fact that the cost of harvesting apples and placing them in our Atlantic coast markets from these states, has been as great if not greater than the entire cost of growing and marketing equally good fruit in our eastern states should have been, is proof enough of the folly of such expansion of apple growing in those states. The present status of the business in the far west furnishes ample confirmation of this statement. The same argument of distance from market applies also to the apple producing states of the Mississippi Valley, though to a less degree as the length of haul is so much shorter. Recent plantings in these states are not great, as shown by census figures and I have been told that many orchards are being destroyed in order to devote the land to the production of cereal crops and stock raising. Possibly we may understand why this is so.

Let us take the crop report of the Bureau of Crop Estimates for the past thirty years for the following; of Vermont and Massachusetts as representing New England; of New York representing the remainder of the great north-

eastern section of the country, including Wisconsin and Minnesota, which produces nearly one half of the crop of the United States; Virginia representing the southern Appalachian states which produces about one fifth of the crop; Illinois representing the great Mississippi Valley; Indiana to Nebraska and Oklahoma which produces another fifth, and Oregon representing the Pacific coast states which produce about one tenth of the total crop. If we consider a crop below 25% as a failure, 25 to 50% a poor crop, 50 to 75% a good crop and over 75% an excellent crop we have figures as follows:

	Failures.	Poor crops.	Good crops.	Excellent crops.	30 yr. average.
Vt.	1	8	10	11	64%
Mass.	1	7	12	10	63%
N. Y.	2	11	8	9	55%
Va.	2	14	10	4	50%
Ill.	7	10	7	6	48%
Wash.	0	1	11	18	77%

Each of these states is fairly typical of the region it represents. If these figures mean anything they are favorable to New England as a region naturally adapted to apple growing. Let us analyze them briefly and see if they are reasonable, and may be relied upon as fairly accurate.

There are four factors that may have great influence in lessening production per tree. They are; (1) spring frosts; (2) unfavorable weather at blooming time; (3) a heavy crop the preceding year; and (4) insects and disease. I believe that one of these factors or a combination of two or more of them is responsible for nearly every small crop of apples that we have.

There are certain things that favor injury by spring frost. Among these are level land and a long blooming season. These conditions prevail over most of the Mississippi Valley so that the cold waves that sweep over the country from the Canadian northwest often cause severe damage, occasionally the absolute ruin of the season's crop. The temperature is less severe toward the south but the long period of danger offsets this in some measure so that spring frosts often ruin the crop in the southern Appalachian region. Occasionally we suffer from spring frosts in New England especially in orchards not wisely located, but in general with our diversified country and short blooming season we are more fortunately situated than any section of the country, unless it be the far west or locations near large bodies of water.

The second factor, that of cold or cloudy weather at blooming time is a more serious trouble with us. Such conditions are unfavorable both to the growth of pollen and the flight of bees. We have more bad weather at blooming time than the central west and far more than the Pacific northwest, and I believe it to be the most serious limitation to crop size with us. It does not mean the complete ruin of the crop as may a spring frost, and I believe that its ill effects may be mitigated in some degree by providing plenty of bees in the orchard so that in the event of bad weather, a maximum amount of pollen transfer may be made during the few good days that are likely to occur during the blooming period.

The records show that only occasionally does one excellent crop follow another. A tree cannot produce a maximum crop and at the same time set buds for a crop the succeeding year. When climatic or other influences throw all or nearly all the trees in a given section into bearing and conditions favor a heavy crop it is only under especially favorable conditions that a good crop follows the next year. This factor affects different sections alike but there is rather less pronounced alternation of crops in the Pacific northwest than in New England and rather more in the Mississippi Valley, due probably to crop failures due to occasional severe frosts.

A frequent cause of poor crops is the ravages of insects and diseases. I do not include here the effect of these pests on the quality of the crop which is often most severe, but on the quantity. The two arch destroyers of the crop here are the codling moth and the apple scab, each of which are often responsible for a heavy drop. In some sections the fire blight is a considerable factor when it destroys the blossoms in a wholesale fashion, but this trouble is not very severe in New England. Insects and diseases are found everywhere the apple grows. In a newly planted district they are often less severe than in one long planted. It takes time for the pests to overtake the rapid migrations of mankind, but they arrive sooner or later unless they are kept out by strict quarantine regulations. Some of the far western districts have enjoyed full or partial immunity from certain insects and diseases, but this advantage is only temporary and will soon pass away if it has not already done so. Some pests are more severe with us than elsewhere but I think any one familiar with the country at large will agree that we are on the whole as well off as any section of the country in this respect.

There are minor causes of poor crops such as dry weather, but I am inclined to think that most of the drop charged to this is due to codling moth and other pests. At any rate in New England under intelligent orchard management this rarely is a factor of much importance.

The following yields per tree are derived from the 1909 census figures, corrected so as to represent the ten year average crop instead of the crop of 1909:

	Yield per tree in bushels.
Vermont,	1.98
Massachusetts,	2.07
New York,	2.94
Illinois,	.57
Virginia,	1.10
Washington,	1.35

These several states are typical of the regions they represent. They show the highest yield per tree to be in New York where very large trees predominate. New England is considerably lower but is much higher than the west and south. This is due largely to the smaller trees there. Trees in the Pacific northwest are many of them young, still the good care they have received added to the natural adaptation of the region to fruit growing give a very fair yield per tree. The trees in the Mississippi Valley are lowest of all, due partly to their low average yield, and in part to their smaller size. Their smaller size is due partly to the larger proportion of young trees and partly to the fact that apple trees do not naturally attain so large a size though they may come into bearing somewhat earlier. I think that it is generally held that in the northeastern states the apple tree is most at home. It thrives best when the average summer temperature is not over 60°. This means north of southern New Jersey and southern Iowa but includes the more elevated regions as far south as Virginia. I have come to the conclusion after considerable study of the question that the part of North America best adapted to the growth of the apple begins at near sea level in Nova Scotia and extends southward into the mountains of Virginia. From New England it stretches west to Lake Michigan. Certain sections of Wisconsin and Minnesota are also well suited to those varieties that are able to withstand severe winters. West of the dry plains there are certain sections of the mountain and more particularly the Pacific coast states that also possess advantages, some of them superior to any part of the country. If they were nearer the great markets I doubt if we could successfully compete with them. It may

be unwise prophecy but I will say that I believe that another generation will see a very large part of the apple growing confined to this section of the country.

If we face a period of lower prices we should know the cost of producing a barrel of apples. I have no extended data to present on this subject. In 1896 the Vermont Experiment Station found the cost of growing and packing a crop in Grand Isle county to be about 80c per barrel, including the cost of the barrel, without overhead charges. Most of the figures I have seen are from \$1.00 to \$2.00 per barrel and most of those I consider nearest accurate and typical run from \$1.50 to \$1.75 to put a good grade of fruit on board the cars. If this is correct an average of \$2.00 or better should mean prosperity for the apple grower and anything below this means a serious lessening of the profits of the business. These figures apply to common varieties of good producing capacity such as Baldwin and a general price level like that of the past few years.

I do not wish to enter into any extended discussion of the markets of the future. I do wish to call attention to the fact that the fruit market is being occupied more and more by fruits other than the apple. Most of these fruits such as the banana and the citrus fruits are brought long distances to the great markets in our northeastern states. It seems to me that if New England apples cannot hold their own in competition with these fruits there is something wrong. I believe that the apple market may be greatly expanded by proper methods and I believe there are movements now under way that will bring about this result in no small degree.

Whenever we study the question of markets from whatever angle we almost immediately run against the question of grades and standards. I hope that the laws recently passed in the New England states will bring about a great deal of improvement along this line.

The apples of the next decade will be of much better quality than those of former years on account of better methods of production and the fact that recent plantings are varieties of high quality. The present extended study of the whole question of marketing farm products cannot but enlarge the market for good apples. *The market is always over-supplied with poor stock.* This point is illustrated by a recent day's sales in the Boston auction market when of two lots of apples sold the same day, one brought 80c per barrel and the other \$3.50. The former lot probably just about paid picking and marketing expense, while the latter price means a good profit. If production over-

takes consumption it will catch up with the eighty cent kind first, for it is always at the heels of that class of goods.

From what has been said we may conclude that even if the market for apples is capable of considerable expansion, we may have during the next ten or fifteen years a number of bumper crops of apples that will somewhat depress prices. I do not look for disastrously low prices, except for inferior fruit. Poorly graded, wormy, diseased fruit such as we frequently see now, will disappear from the market. It will force out of the business the indifferent grower with whom the orchard is a side issue, receiving little or no attention except at picking time. Growers located far from market will feel the pressure. If the bulk of the Pacific coast apples now coming into the markets east of Chicago does not disappear within the next ten years it will be a sad comment on the ability of the eastern orchardist to take advantage of nature's favors. I do not believe it is sound economics to put so much of the consumer's price into long distance transportations of so bulky a commodity.

I believe that conditions will force some radical changes in eastern orcharding and our whole system of farming. These changes may work temporary hardship on some farmers who now get a portion of their income from their apple crop, but in the end, when readjustment has taken place they will be better off than before. I look to the county agent system to be of immense value in promoting a wise readjustment of such farms.

There are three ways in which the profits of any business may be increased: by lessening cost; by selling more goods, provided they are sold at a profit; and by obtaining a higher price. Any increase of the profits of the business must come in one of these three ways or from a combination of two or all three of them.

One way in which production costs may be lessened is by a better organization of the farm business. Vermont is and probably will be for a long time a dairy state but unless conditions have greatly changed in the last fifteen years it is too exclusively a dairy state. On most farms dairy products make up all or nearly all the cash income. I do not believe that such a system of farming can ever measure up to the highest possible success. Any well-managed dairy farm must produce a cash crop if the most is made of the farm. It seems to me that the Vermont farmer must in most cases choose his cash crop from hay, potatoes and apples. To all of these crops Vermont conditions are well

suiting, which should be chosen depends upon the character and location of the farm and the individual preferences of the operator. The well organized, well managed dairy farm which has a good 10 acre orchard may have nothing to fear from future over production for under such conditions the costs of production will be as low as they can well be.

Whether one may wisely plan an expansion of his orchard in order to sell more fruit is a many sided question. I have no doubt that one should endeavor to increase the production of the bearing trees he has to the highest possible degree, by the application of the best known orchard methods. I believe that under some circumstances new plantings may be wisely made in order to balance up the business provided experience shows that a good grade of product can be produced. The striking characteristic of the business of fruit growing during the next ten years will be its transformation through the exclusions of the producers of inferior product while the better growers are enjoying a satisfactory degree of success. I do not wish to be understood that the men who are in the fruit business exclusively with no other cash product from their farm are facing disaster. They are taking chances. Some will in the next few years achieve great success, others will meet with failure. The farmer with a somewhat diversified business has a safer proposition. He stands in less peril both of great gains and great losses. If I were a grower being by nature conservative rather than adventuresome, I would advise either diversification or an offensive and defensive alliance with brother orchardists. In other words cooperation in both production and marketing, more especially in the development of the market for great consumption of New England grown apples. Five cents per barrel wisely expended in advertising Champlain Valley apples would extend the demand beyond the power of the valley to supply. It may seem like sacrilege to commercialize the charms of the Champlain valley and yet is not the product advertised worthy in every way of the country in which it grows.

In conclusion, I believe there will be a considerable increase in the size of apple crops during the next ten or fifteen years. How great I do not know, but it will be enough to crowd inferior fruit from the market and we all realize that when this is accomplished there will be a big hole to fill. The sooner the grower of inferior fruit realizes this and either diverts his efforts to other lines or improves his methods, the better for him and all others concerned. While this is going on the up to date growers may

still enjoy prosperity. The eastern man and especially the New England growers face conditions and markets which should enable them to hold out in the struggle. If I have not seemed to paint as rosy a future as you would like, please remember that I have tried to approach the subject with a spirit of inquiry for the truth rather than with a determination to prove a favorable case for the fruit grower. But I believe that looking at the business broadly we stand at the threshold of an era of great progress in the production of first class New England apples.

PROFITS IN APPLE GROWING.

PROF. U. P. HEDRICK, NEW YORK EXP. STA. GENEVA, N. Y.

I take it that you men before me are all growing fruit for the money you can make. In common parlance you are business men. Yet in this day, in which efficiency is the slogan of business, how many of you have precise knowledge of what your capital and labor are accomplishing? How many figure accurately profits and losses? If making money, how many can find the goose that lays the golden eggs? If losing, how many can locate the leak? How many have made a physical valuation of the property in your possession and actually know your assets and your liabilities? At the risk of being thought presumptuous I venture to say that not many in this audience can give anything like a clear statement of the financial condition of their business. Yet I do not believe that any one of you is willfully negligent of your money matters, but, lacking data with which to start and method with which to keep track of the outgo and income of your orchard, life spins past with your business affairs in a tangled skein which you hardly dare attempt to unravel.

No doubt before me are a number of men from city or town who are planting orchards—beginners embarking upon what seems to be a pleasing hobby and yet one capable of giving a living and an income for old age. Possibly all will go well. It is to be hoped that your castles in the air will materialize, but if your venture is founded on the figures you have seen in some of the mushroom magazines, or on the occasional phenomenal crops that nearly every orchard bears, the chances are you will find the times out of joint long before your plantings come into bearing and will take to building aerial castles in some other profession.

You will learn through experiences dearly paid for that many of the cocksure statements you have read or heard are but the stuff dreams are made out of; that figures often pass through the transformation that Alice in Wonderland underwent when she drank from the magic bottle and immediately grew to gigantic proportion. Thousands of newly-fledged fruit-growers, the country over, who are now drawing checks on the bank of expectancy, will leave money rather than take it from the field of horticulture. You and they might not thus have been deluded had there been anywhere a substantial body of figures from which could have been obtained a true conception of the financial conditions of fruit-growing.

We are well justified in saying that with increasing competition, manifold uncertainties in orchard conditions and unbusinesslike administration, fruit-growing is becoming a more and more risky business. In the hands of the careless and uninformed it is likely to prove as unstable as a house of cards. Of all this you need to be reminded rather than informed; for, experience and the teachings of years have given the old hands among you, at least, knowledge of the uncertainties in growing fruit and now, everywhere we are hearing discussions of the business side of the industry. Temporarily the "idea of making two blades of grass grow where one grew before," with which agriculture has been chiefly concerned in the immediate past, is eclipsed by the conception, just beginning to be realized, that agriculture is a rather highly developed enterprise requiring for success careful business management. We are beginning to realize, too, that in neither the art of production nor in the business management are the difficulties transient troubles to be solved once for all; rather they are permanent problems made daily more urgent by new complications and keener competition.

Coming now to the subject of my paper, "Profits in Apple-Growing," I have to say that it is presented with the hope that it may prove a helpful contribution to those who want data on the cost of producing apples and on the yields, selling price, and profits in the culture of this fruit. I hasten to say that you must not expect anything like a full consideration of the subject. Neither time nor material suffice for that; for, keeping accounts in apple-growing is a difficult and complicated piece of business. The yearly inventory and striking of balances which do very well for the grocer and butcher do not begin to tell the whole story in fruit-growing. In growing apples, for instance, it takes several years to bring an orchard in bearing, after which it barely maintains itself for a decade or two; the lean years

and fat years are more accentuated than in most other industries; advantages and disadvantages are exceedingly changeable; and the value of the investment is variable. Indeed, fruit-growing is not far removed from gambling pure and simple, and I imagine a gambler has trouble in keeping accounts.

The only possible way to obtain an absolutely accurate reckoning of the profits and losses of an apple orchard is to add up the expenses for the whole life of the trees and subtract from the total income; the remainder, if plus, is the profits; if minus, as will be most often the case, the losses. This plan in our short span of life will not work. Since annual accountings are not fair and total ones not possible, we must divide the life of the orchard into periods and take data for each division. In this region where the apple lives as long as man, we may make from the life of an orchard seven periods of a decade each. The seven periods ought to make very fair units for the collection of data.

Unfortunately we do not have for any one of the seven periods much accurate data either as to the average total cost of production or the cost of any one of the several orchard operations, nor do we know much about the average cost of the materials used in orcharding, or the average selling price of the produce of the orchard. Now the value of such data is obvious to those of you who are making any attempt to keep track of the finances of your business, and the object of the present paper is to put you in possession of figures that, rightly used, ought to be helpful. I say rightly used because most figures are capable of several interpretations and all are subject to the lapses and mistakes common to erring mortals.

The fruit to be considered is the apple as grown in our orchard situated a few miles west of Rochester, New York. Added value is given to the figures I have to present by the fact that the orchard was selected for experimental work because it was as typical as could be found of the great apple belt of Western New York. The trees are Baldwins, twenty-seven years old at the beginning of the experiment, thirty-seven now. Our accounts tell what each of the orchard operations has cost, the number of bushels of fruit produced and the selling price. In short, we think we have something substantial to show what the outgo and income of a New York apple orchard is in the fourth decade of its life, the period just preceding prime of life. We shall give data, as far as possible, for three units, the barrel of apples, the tree and the acre.

The first information we must have in getting at a problem is the number of barrels of apples per acre, per year. The exact number for the cultivated plot in this ten-year average is 116.8 barrels. Graded, the acre average for the period is 79.2 for barrelled stock; 37.6 barrels of evaporator and cider stock. Reducing these figures to the tree unit we have for barrel stock 2.93; for evaporator stock 1.4. Total per tree, 4.33 barrels. The proportion of evaporator and cider stock is seemingly high—made so by two autumn gales in different seasons which gave many windfalls. Such episodes come in the life of every orchard. Yields per acre will vary greatly with the same variety in different orchards even in the same section but there is little reason to think that the ten-year acre average just given is much above the mark for orchards that are cared for—well tilled, sprayed and pruned plantations. It is, of course, much greater than the average yield of Baldwins in New York for the reason that fully half of our orchards, to the shame of the State, are wholly or partially neglected.

The first item in cost of production to be considered is interest on investment, and we come at once to an entry in our account over which there can be much disagreement. What is a Baldwin orchard in full bearing, in the prime of life, worth? Sales are too few, and most of those that take place are made under conditions too abnormal to make selling price a safe gauge of value. Suppose we make the value \$500.00 per acre and call the interest five percent. This valuation is not high, for it includes not only cost of land, trees and labor for the deferred dividends of the first twelve or fifteen years. It is sufficient, too, to cover the overhead expenses of houses and barns—or, at least, the share of these charges that would fall to a ten-acre orchard in New York. Our first expense item, then, is \$25.00 an acre on investment, a sum which divided by 116.8, the number of barrels per acre, gives us a charge per barrel of twenty-one cents as interest on investment.

Taxes vary greatly in different counties as they do somewhat in different years in the same county. Since this orchard is but a part of a general farm, we can only estimate the cost of taxes. There are few regions or years in New York in which taxes for such an orchard would be over \$1.50 an acre, making the tax on each barrel of apples 1.2 cents.

The next account to be charged to cost of production is depreciation in teams and tools, and interest on the money invested in them. First-class machinery for running the average orchard will cost in the neighborhood of \$1,000.00,

the items as follows: Teams \$400, spraying outfit, \$250, harness \$50, wagon \$75, plow, harrows, ladders, crates, pruning tools, etc., \$115. The figures named are below rather than above the average prices but there are few instances, indeed, in which the tools and teams named would be used exclusively for a ten-acre orchard. If we set the depreciation and interest on money at 20 percent for the above equipment we must add seventeen cents per barrel of apples to the depreciation account. Take notice that in obtaining the cost of production in the orchard under discussion the depreciation account must be thrown out for the Station hired all work done and the workmen furnished their own teams and tools. This item is put in, then, only as an approximation of what men who are doing their own work must charge for depreciation.

Passing now to orchard operations we find that the annual cost of tillage per acre for the decade was \$7.39, making the amount to be charged against each barrel of fruit 6.3 cents. Tillage consisted, in this orchard, of plowing the ground in the spring after which it was harrowed, rolled and then cultivated by harrowing an average of seven times per season. The price paid for team work at the beginning of the period was \$4.00 per day of ten hours; but the price advanced to \$5.00, a fair average being \$4.50. Tillage includes the labor of putting in the cover crop but not the cost of the seed. For the cover crop seed, in this orchard usually red clover, must be added \$2.74 per acre for seed or 2.3 cents per barrel of apples.

The expense of pruning per year per acre was \$3.56—since there are twenty-seven trees to the acre in this orchard the cost per tree was 13.1 cents. The cost per barrel of apples was three cents. The average price paid for the work was \$2.00 per day of ten hours.

The average cost per acre for spraying was \$11.28; per tree 41.8 cents; per barrel of apples 9.6 cents. The spraying was done the first few years with a hand sprayer, then, for several years, with a Niagara gas sprayer, and the last three with a gasoline power outfit having two runs of hose. The first five years bordeaux mixture and arsenate of lime were used; the last five, lime and sulphur and arsenate of lead. Now I come to a statement which I would hardly dare make in the presence of the plant pathologists and entomologists. The orchard was sprayed three times per season the first five of the ten seasons. The second five years it was sprayed but twice per season, the first application being the dormant spray made just before buds began to swell; the second just as blossoms dropped. This treat-

ment has given an almost perfect crop, wormy and scabby apples being rarities scarcely to be found in the orchard.

The last of the cost of production charges is that of superintending the work. The services of the average fruit-grower are worth more than the \$2.00 per day allowed for actual work and this deficiency should be made up by a charge for superintending the work. The Station paid for this service \$300.00 per year. This, in my opinion, is a fair price, since there are few competent orchardists who could not superintend a farm enterprise of several times the magnitude of a ten-acre orchard. The charge to be entered against a barrel of apples then for superintending is twenty-five cents; against the acre unit, \$30.00; against an apple tree, \$1.10.

Picking, packing, sorting and hauling have been done in diverse ways during the ten years and the items cannot be segregated. But the total cost of these operations has been 24.4 cents per barrel. The apples, it should be said, were sorted and packed in the field. The crop was hauled to the depot one and one-half miles away over a country road not better than the average. The following is a summary of the cost sheet for a barrel of apples:

Interest on investment,	\$.21
Taxes,	.012
Tilling,	.063
Pruning,	.03
Spraying,	.096
Cover crop,	.023
Superintending orchard,	.25
Picking, packing, sorting and hauling,	.244
	<hr/>
	.93

All of the "first" and "seconds" apples from this orchard have been packed in barrels. The average price of barrels for ten years has been thirty-six cents each, the price having fluctuated from thirty to forty cents. The culls have been handled in crates and a charge for packages cannot be entered against them. Adding the cost of the barrel to the cost of production we have \$1.29 as the total cost of a barrel of apples.

We come now to the average price of apples for the past ten years as grown in this orchard. We have received an average of \$2.60 for all the barrelled stock sold which includes firsts and seconds. For evaporator and cider stock we have received sixty-seven cents per barrel, rather above the average possibly, because two seasons' gales of wind,

as I have said, gave an abnormally large quantity of very good windfalls.

We are now ready to calculate profits and declare dividends:—Subtracting \$1.29, the cost of a barrel of apples, from \$2.60, the amount received, we have a net profit of \$1.31 per barrel for firsts and seconds. Multiplying by 79, the number of barrels per acre, we have \$103.49 as the profit per acre for firsts and seconds. Subtracting 72c from 93c we have 21c as the difference between average cost of production and average selling price of culls. Multiplying 37.5, the number of barrels of culls per acre, by 21, we have a loss of \$7.89 per acre on the culls, leaving the average net profit per acre in this orchard for the past ten years \$95.60; add to this the \$25.00 interest on the investment and we have \$120.60, net or 24.12 percent as the annual ten year dividend from this orchard.

In closing I must make several general statements:

The first of these is that we have not been skimming the pan in this orchard work, and the milk that is left is equally as good as that we have taken. We shall expect this orchard, barring accidents, to do as well, or rather better, during the next twenty years than it has in the past ten.

Secondly, as good or better dividends are coming from many New York apple orchards similarly situated and similarly cared for. The figures given are a fair average for a Baldwin orchard in its fourth decade. The cost of production is, if anything, high since the State cannot do work as cheaply as an individual. The extra cost, if such there be, has been offset, however, by the skill and efficiency with which the superintendent in direct charge of the work, has managed every detail.

Third, the profits of this orchard are probably many times greater than those from the average plantation in New York. Indeed, I suspect that if we had the financial history of every apple tree in New York we would find that the total cost of all quite equals the receipts from all—in other words, many are losing and few are winning. This is the history of financial endeavors in all industries.

Fourth, and in conclusion, the dividend of 24.12 percent on an investment of \$500.00 per acre stands for the opportunity in the hands of the apple-growers of New York. It remains for the individual to accept and make the most of the opportunity or to neglect it. Ali Hafed, a prince in India, sold his estate to search for diamonds in foreign lands. His successor, watering his camels in the garden,

saw the gleam of gems and found acres of diamonds, and Ali Hafed's estate became the Golconda mines. Had the Indian prince had eyes to see he would have had boundless wealth at home instead of poverty, starvation and death in a foreign land. And so there are bonanzas in growing apples right at hand for those who have eyes to see and hands and brain to work.

THE APPLE BOX AND HOW TO FILL IT.

HON. A. J. EATON, SOUTH ROYALTON.

We used to be told that the box package would in time take the place of the barrel package for apples. This probably will never occur. There is however, a certain market which calls for apples in boxes rather than in barrels. People will accept almost anything for an apple in barrels at some price but they expect good fruit in boxes because they have been buying good fruit in boxes. It was the western apple with its high color and uniform good quality which made the box famous and not the box which made the western apple famous. The mission of the bushel box is to induce growers to produce better fruit. Apples which look fairly well in barrels do not look as well in boxes therefore the box is not the package for poor or inferior fruit.

Some people make the mistake of thinking that packing apples in boxes will improve their quality, the same as they do that placing fruit in cold storage will improve the quality but such is never the case. We will take out of the box, or out of storage, nothing better than we put in.

The first requisite, then, is to have something worth packing in boxes. The factor, which, after this decides whether we shall use boxes or barrels as containers for our fruit is the market in which the fruit is to be sold. As a general rule the nearer home that our fruit can be marketed the better it will be both for the fruit and for ourselves. There are in every community a class of people who prefer to have their apples come to them in the original package and the box of nicely wrapped apples appeals to them. There is an air of cleanliness and wholesomeness about such a package that is found nowhere else.

If one has fine fruit and a market which calls for box apples how shall he go about packing those apples in boxes and where procure his boxes? I have nothing to say to

the man who is growing a thousand barrels or more per year and has his market established. He is already doing well enough. The small grower who has a few apples and would like to box them may get a few suggestions from our experience. We make our own boxes. We first have the lumber sawed into 1 inch boards,—using pine, spruce, poplar or hemlock. We then have both sides of the board planed and use what will cut the right width for ends, and re-saw the strips for sides, bottom and cover, on a band saw. In this way we can use poor, and wany edged lumber without any waste.

The standard bushel box is $10\frac{1}{2}$ by $11\frac{1}{2}$ by 18 inches inside measure. This gives us an end $10\frac{1}{2}$ by $11\frac{1}{2}$ inches. We use two pieces for each side, two pieces for the bottom and three pieces for the top making eleven pieces for each box. Bushel boxes sell on the market for 17 cents each this season. We are able to reduce this cost by two or three cents, and incidentally, it makes a good market for our low grade lumber.

A box of apples to be properly packed must be full all around, and when the cover is nailed on every apple must be tight. To secure this tightness we are obliged to pack the box a little more than full so we will have a little bulge both sidewise, and on the top and bottom. In the west where so many apples are packed in boxes the packing of apples has been reduced to an exact science. We may readily secure a list of the different sizes of apples with the pack which each size requires and there is a certain way in which apples of any particular size or shape may be packed so they will exactly fill the box. When we have secured such a list and proceed to put in practice the information given us, we at once encounter a serious difficulty. This list will tell us that all apples of a certain diameter must be packed in a certain way but in practice we soon learn that a long apple like the Belleflower requires a different pack from that required by a somewhat flattened apple like the Shiawassie. The only way in which we may be sure of getting the right pack is by trying it. If your box does not come out just right, that is, if it is not quite full or if it is more than full you may be sure that you have used the wrong pack.

The white paper for lining the boxes costs \$2.55 per 1,000 sheets and it requires two sheets for each box. The tissue wraps cost about 40 cents a 1,000 sheets and can be purchased from any printing house. Those which we use are cut eleven inches square and are large enough for all but the very largest sized apples.

There is no excuse for "Deaconing" a barrel of apples but there is much less opportunity to be dishonest in packing in boxes. We should remember that in packing box apples it is not only true that "Honesty is the best policy", but "Honesty is the only policy".

GRASS MULCH—A PRACTICAL SYSTEM OF ORCHARD MANAGEMENT.

PROF. J. H. GOURLEY, DURHAM, N. H.

The subject which I have selected for discussion this evening is Grass Mulch—A Practical System of Orchard Management, but with your permission I would like to modify it to include a comparison of some other cultural systems often followed in the East such as sod and tillage. I ask this privilege in as much as I see those subjects are not to be discussed elsewhere on the program.

Last year I had the honor of addressing this society on Factors Which Influence Regular Bearing in the Orchard and at that time I told you something of our experience with tillage and the splendid results we obtained from its use. And I feel it might be proper and fair at this time to tell you something of our experience with the grass mulch. Unfortunately authorities have not agreed on the value and practicability of these various systems of culture and we have had horticulturists divided more or less definitely into schools representing the one or the other. This I think is very unfortunate in the face of the facts which point to but one conclusion, namely, that both tillage and grass mulch are practical systems of culture but with somewhat different adaptability.

SOD AND TILLAGE FOR ORCHARDS.—First I would like to invite your attention to the effect of sod on an apple orchard. It is pretty generally accepted that it is a poor practice to grow trees in grass, cutting the hay and removing it year after year. New England orchards suffer too extensively from this practice, mostly however by the owners of the small orchards. While occasionally we find an orchard standing in grass which is doing well in spite of that fact, most of them are declining in yield and in vitality.

For the past few years the N. H. Experiment Station has been conducting some experiments to determine the value of various soil treatments and among other things

we have been attempting to learn why sod is detrimental to fruit trees. Under sod we find the yield consistently low, the color of the foliage usually poor, the size of the leaves small and the annual growth of twigs averaging only about 4 inches in length. The trees are sprayed and pruned the same as the others receiving better soil treatments which doubtless has a beneficial effect, yet if the whole orchard yielded in proportion to this plot the land would be more profitable if used for something else.

Soil samples are taken each week during the growing season in these orchards and the moisture and water soluble nitrates are determined. It has been somewhat surprising to find each year that the percentage of moisture under the sod was a little higher than on the adjacent plots which were tilled. The average for the past four seasons which consists of 66 determinations shows the average percent of moisture under sod to be 20.25%, clean culture 15.698% and tillage with cover crops, 17.842%. Therefore in the orchards under observation moisture is not the limiting factor, but we must look to something else which is responsible for the poor conditions in the sod. Since the soil is practically identical in these plots the native fertility can be assumed to be practically the same which eliminates that factor as causing the difference. The next factor which has attracted our attention is that of the available nitrogen in these plots. Here we think we find the limiting factor so far as fertility is concerned. For four years we have found the average weekly nitrates (parts per million of dry soil) recovered in our soil samples to be 3.18, while under tillage it average 17.40 parts per million, and under tillage and cover crops it averages 33.91 parts per million, which leads us to the conclusion that nitrogen in an available form, which is so essential to plant life, is greatly reduced in a sod orchard and would probably in a large measure account for the poor growth and yield and the yellowish appearance of the leaves.

However, this evidence did not seem to be sufficient to prove that the nitrates were not actually formed under the sod but rather raise the question whether the grass and the trees together did not use up such enormous quantities of nitrates that the supply was not sufficient for both. So the past summer we have attempted to determine how far that might be true. A small plot, 3 feet square, was selected in the sod plot close to where the soil samples had been taken and the sod carefully removed without disturbing the soil beneath. Another plot 3 feet square, was selected adjoining the bare one and the sod again removed and the

soil spaded to the depth of the surface soil and hoed each week. In this way we hoped to determine the approximate amount of nitrates used by the grass and how much the nitrates would be increased if this same soil were stirred. The results are in line with the actual behaviour of the orchard and show one of the reasons why trees seem to starve when grown in sod. The average nitrates for the season under the sod were 2.656 parts per million, under the bare soil, 6.010 parts per million, and where the soil was stirred each week, 26.469 parts per million. This increase simply from stirring the soil is the index to the difference between 1 barrel of apples per tree and 3 barrels, or 300 percent. increase, while the growth is more than twice as great. For the progressive fruit grower the lesson is plain, more nitrates must be furnished our trees than they are likely to get when grown in sod.

GRASS MULCH.—All this would seem to point distinctly to but one proper method of handling an orchard—namely cultivation. But we find conditions where the grower feels that he cannot cultivate his orchard because of lack of labor, erosion of the land, expense involved, or one of the many other reasons which are set forth. And the actual result is that he does nothing and the orchard in consequence suffers. Now it is my observation that orchards are productive and vigorous largely in proportion to the soil treatment which they receive rather than to other orchard practices. It therefore is not a question whether tillage is better than grass mulch but whether grass mulch is better than nothing. Now we have our enthusiasts for the mulch system who believe that it is much superior to cultivation and they resent its taking a second place. This is more common however in other sections of the country outside of New England. But it would be ignoring the facts not to recognize that there is evidence in several places to show that grass mulch combined with the intelligent use of fertilizers has given results equal to those secured by a good system of cultivation.

Briefly the grass mulch method consists in growing trees in grass and a mulch of grass, hay, straw or other material is kept around the trees out to the drip of the branches. Care should be taken not to allow the mulch to extend to the base of the trees as there is no necessity for it and injury may result.

It would be necessary of course as the trees get large to bring in mulching material from outside the orchard, unless the growth of grass is very heavy indeed. Here is probably one of the weak points in the system, there is a

tendency not to renew the mulch sufficiently and growing grass takes the place of the mulch and the trees begin to go back after a while and produce small apples and few of them. That is we might go so far as to say that it is not a big step to pass from the mulch system to a slovenly system. It should be said also that the mulch is better adapted to lighter soils than it is to heavy clay soils.

There have been a number of experiments reported on this system of orcharding, but I think there are no extensive ones in New England. In connection with our orchard at Durham which is cultivated, we have recently acquired another small orchard on the same farm and have begun an experiment with the grass mulch. Various fertilizers have also been applied each spring and the results are rather striking. The rows are fertilized as follows:

Row. No.	Treatment.
1	7 pounds basic slag per tree.
2	5 pounds nitrate of soda.
3	3 pounds sulphate of potash.
4	CHECK.
5	{ 5 pounds nitrate of soda.
	{ 7 pounds basic slag,
6	{ 3 pounds sulphate of potash,
	{ 5 pounds acid phosphate.
7	{ 7 pounds basic slag,
	{ 3 pounds sulphate of potash.
8	CHECK.
9	{ 3 pounds sulphate of potash,
	{ 5 pounds nitrate of soda.
10	5 pounds acid phosphate.

From a few weeks after the fertilizer was applied for the first time a slight difference in color of the trees could be seen where nitrogen was included. Later in the season there was evidence that a stronger growth was made in each of the nitrogen rows, altho all the trees in this block were in a very fair condition. Each season the same difference has been noticeable. The past spring when the trees were in bloom, the effect of the fertilizers was very evident. The nitrogen trees were very full of bloom without any exception, while the other rows had a tree here and there with practically no bloom, and the average difference was considerable. During and following the blooming season we experienced considerable rain and cloudy weather and as a consequence we had a low percent of blossom setting and a heavy drop followed setting, so that the harvest was not up to our expectations in the spring. However the

apples were of good size and free from fungous disease and the crop was fair. The difference in yield is seen in the following table:

**GRASS MULCH EXPERIMENT WITH BALDWINS.
8 TREES PER ROW, 1916.**

Row No.	Treatment.	No. bbl. per row.	Percent No. 1 size	Value of crop.
1	7 lbs. basic slag per tree,	13.50	75.40	\$29.60
2	5 lbs. nitrate of soda per tree,	20.63	80.15	46.46
3	3 lbs. sulphate of potash per tree,	13.92	86.01	32.35
4	Check,	9.48	83.40	21.72
5	5 lbs. nitrate soda,			
	7 lbs. basic slag,	28.88	81.18	65.40
6	5 lbs. acid phosphate,			
	3 lbs. sulphate potash,	8.91	90.94	21.26
7	7 lbs. basic slag,			
	3 lbs. sulphate potash,	7.52	86.35	17.51
8	Check,	12.43	91.35	29.72
9	5 lbs. nitrate of soda,			
	3 lbs. sulphate potash,	21.08	89.66	49.97
10	5 lbs. acid phosphate,	4.76	88.78	11.22

This shows an average yield from the check rows of about 10½ barrels, from the nitrogen rows an average 23½ barrels, and practically 11 barrels from the rows fertilized with potash, basic slag, or phosphate but not including nitrogen, or a gain of 133 percent from the nitrogen fertilizer.

The color of these apples was not so good as from the other rows, in fact the lower the yield the better the color, but the increase in production far outweighed the factor of color and they all were barrelled and went in the same car at the same price. They are figured at \$2.50 per bbl. for No. 1 and \$1.25 for No. 2 which gives the results in the last column of the above table. This shows the value of the crop from each row, which represents an average difference in favor of the nitrogen rows of \$28.22. The value of the fertilizers in normal times which were required to produce this result would be about 14c for nitrogen, 8c for potash, 4c for acid phosphate and 6c for basic slag per tree per year, or not over 25c per tree in total. It also shows that at the end of the third year there is little to show that the money expended for fertilizers other than nitrogen has yet given us a return. It also shows that in this orchard the mulch system would be far from efficient if it were not supplemented with nitrogen. This is in line with our previous experience with the reduction of nitrates under sod and evidently the difference between the sod and

grass mulch is not sufficient to furnish the trees with all the nitrates required for maximum results.

In conclusion I may say that I believe where at all possible all young trees should be cultivated for about 5 or 6 years and if the grower desires to stop tilling his orchard, it can be seeded down and operated under the grass mulch system with fertilizers and good success can be attained.

SOME ASPECTS OF FRUIT GROWING IN CANADA.

**PROF. W. T. MACOUN, DOMINION HORTICULTURIST,
OTTAWA, CANADA.**

The problems in connection with fruit growing in Canada, and particularly the province of Ontario, are very similar to those met with in the state of Vermont. The fruits grown in some parts of the province of Ontario are very similar to those grown in the warmer parts of Vermont, while those in northern Vermont are very much like those in eastern Ontario, and the province of Quebec.

The chief fruit growing centres of Canada are the Annapolis and adjacent valleys of Nova Scotia; the large areas adjacent to and reaching back from the lakes Ontario, Erie and Huron in the province of Ontario; and the many valleys of British Columbia, both irrigated and non-irrigated, which correspond with the great fruit valleys of Oregon and Washington. In addition to these principal fruit centres there are immense areas in the provinces of Prince Edward Island, Nova Scotia, New Brunswick, Quebec and Ontario where the hardier fruits succeed well, and where the Duchess, Wealthy and McIntosh apples grow to perfection. In the province of Ontario alone there are 8,783,609 apple trees. It is estimated that the annual value of the fruit crop in Ontario is \$20,000,000 and that the capital invested in the industry in that province is \$80,000.00.

SPRAYING.—The season of 1916 was a very unfavourable one for apples in the province of Ontario owing to the exceedingly wet and cool weather in the early part of the summer which favoured the development of apple scab with the result that only those who sprayed thoroughly got good fruit. Never was the value of thorough and persistent spraying so well demonstrated. At the Central Experimental Farm most of the trees were sprayed five times and the McIntosh apples six times, and, although the

scab started to develop freely, it was held in check with the result that a large proportion of the fruit was number 1 grade. The trees were sprayed with lime sulphur, 1 to 9, just as the leaf buds were breaking; with lime sulphur 1 to 35 just before the flowers opened; and as soon as the petals fall and in the proportion of 1 to 40 for the later sprayings. Dry arsenate of lead was used with the three earliest sprayings in the proportion of $\frac{1}{2}$ pound to 40 Imperial gallons of the mixture. Even at the strength of 1 to 40 there was some burning of foliage this year owing, no doubt, to the very tender condition of the foliage after so much rain, but the injury was not great. Usually the first three sprayings insure clean fruit. Where there is no scale earliest sprayings in the proportion of $1\frac{1}{2}$ pounds to 40 first spraying may be delayed until just before the flowers open, the time when the second is usually given.

CULTIVATION.—This year, owing to the long continued drought from mid-summer until September, the value of having a good supply of moisture in the ground was very apparent. Where the soil was dry the apples dropped badly. A few years ago the importance of having moisture early in the season was very much impressed on me by the results in an orchard of the Wealthy apple at Ottawa. The orchard was in sod. The outside row of trees on one side of the orchards had cultivated ground on one side of them while on the other side there was sod on both sides. The trees on both rows had a large amount of bloom but there was practically no fruit set on the row with sod on both sides, whereas fruit set well where there was cultivation on one side and a good supply of moisture. In many places in Vermont it is not possible to cultivate thoroughly owing to the steep hillsides, but where cultivation is practised we believe it will give the best results. It is very desirable to have cover crops in the orchard and at Ottawa we plan to cease cultivation about the end of June and as soon as possible the seed for the cover crop is sown. We find that Summer vetch or tares are very satisfactory as they grow late in the fall and are not readily frozen. Red Clover makes a good cover crop but, sometimes, if the season is very dry, it is difficult to get a stand in mid-summer. We use rape a good deal as a cover crop, mowing it down at picking time, there being time for it to grow again before winter. If the cover crop is not turned under in the fall it should be as soon as possible in the spring as, if it is left later the ground may be too dry and the fruit fails to set well. The sod-mulch method by which a mulch of straw is kept about the base of the trees during the growing season may give

good results where cultivation is not possible in Vermont. This mulch not only conserves moisture but prevents the baking of the ground, thus making the access of air to the soil easier; the free entrance of air into the soil when the ground is cultivated is no doubt one of the chief reasons why such good success usually follows cultivation. Both the plant food and the roots of the trees need air.

PRUNING.—Much has been said and written in regard to pruning and in recent years summer pruning especially has been much advocated in some quarters. Recent bulletins published in the United States giving results from summer pruning have not shown that there is much, if any, benefit derived from it so far as increasing the bearing of the tree is concerned. It is important to shape the trees well when they are young so as to make them strongly built and able to withstand the heavy crops which they will bear later on. From three to five main branches are sufficient to leave on the newly set tree, the temptation being to leave all that are found on the tree when it comes from the nursery. After the initial pruning at planting time when the main branches are pruned back from one-third to one-half, it does not seem desirable to prune heavily before the tree comes into bearing, the object should be to keep the cross branches or apparently useless branches cut out, but not to head back severely every year, as is sometimes done. The less severely the trees are pruned the earlier are they likely to bear good crops.

VARIETIES.—While new varieties of apples appear from time to time, some of the old sorts are still the most reliable, Baldwin, Greening, Spy and McIntosh being four of the most popular in the more favoured sections, while in the colder parts such as in northern Vermont, the Duchess, Wealthy, McIntosh, Fameuse and Wolf River should prove the most profitable.

Too much praise cannot be given the McIntosh apple which originated over one hundred years ago in the province of Ontario. This fine apple becomes more popular every year and it well deserves all the praise it gets. The tree is very hardy, hardier than the Fameuse of which it is supposed to be a seedling. It is an annual bearer and never overloads. The fruit is of very handsome appearance and of the highest quality. Though somewhat subject to scab, the disease can be controlled by through spraying.

Efforts are being made at Ottawa to obtain other varieties as good as McIntosh, but of different season, and many new sorts have been produced. Perhaps two of the most promising seedlings of McIntosh are the "Melba" and

August apple of the McIntosh type, and the "Joyce", a September apple of the same type. Seedlings of Northern Spy having somewhat of the Northern Spy flavor but being in season earlier than Spy, are also promising. "Rocket" is one of the most promising of these.

INSPECTION AND SALE ACT.—Perhaps one of the most important aspects of the work in horticulture in Canada is the Inspection and Sale Act passed some fifteen years ago, by which the character of fruit sold in closed packages is regulated. The carrying out of this Act is entrusted to Mr. D. Johnson, Fruit Commissioner for Canada. Under the Commissioner there are about 65 inspectors, stationed mainly in the chief fruit centres of Canada. The grades of fruit which may be packed are Fancy, Number 1, No. 2, and Number 3. Fancy fruit must be practically all perfect throughout the package. Number 1 fruit must be 90 per cent free from blemishes, and Number 2 fruit 80 per cent. The Number 3 grade is not defined. The packer's name and address must be put on the box or barrel. The inspector acts both as an advisor and inspector as it is desired to help the fruit growers to pack their fruit better. Most of the fruit is now inspected at the point of shipment and if asked for, a certificate of inspection is given. Sometimes the fruit is again inspected at the point of destination, as a check on the first inspector, or in case a shipment is overlooked. While there are some prosecutions every year, this Act has been of great benefit to the fruit trade of Canada. The standard apple box in Canada is 10x11x20 inches, it not being permitted to pack apples in a smaller box than this. The smallest barrel that may be used for apples in Canada is one holding 96 Imperial quarts, the Imperial quart being about one-fifth larger than the measurement used in the United States.

VARIETIES OF APPLES.

DR. J. K. SHAW, AMHERST, MASS.

New England may be said to be the cradle of American Pomology. The early settlers brought with them seeds and trees from old England and as soon as the sterner necessities of their food requirements were supplied, turned a share of their attention to the cultivation of orchard fruits. Their chief interest lay in apples and pears; the grape and its product did not appeal to them, and the romantic and almost tragic development of the American grape

industry found its unfolding in distant sections of the country. But apples and pears appealed to them and during part of the last century we find centered around Boston a group of men who, with others in New York, Ohio and neighboring states, were laying the foundations of American fruit growing. Among them were Cole and Thatcher who a century ago were commencing their study of fruits. Then came Hovey whose elaborate and painstaking work has scarcely been equalled since, and Wilder who was instrumental in founding the Massachusetts Horticultural Society, one of the pioneers of its kind. Wilder was the father of the American Pomological Society. These men and their contemporaries, among whom we may well include Goodrich and Hoskins in Vermont, were the founders of Pomology in America. They carried on their work from pure love of it and without the material rewards that furnish the stimulus of modern devotees of the art. They were students of varieties. Most of their work and writings were given over to the testing of the many varieties of fruits that came under their observation, the determination of their value and which of them were worthy of perpetuation for future generations. The multitude of varieties that had arisen, through the methods of propagation by seeds gave them a superabundance of material. It is recorded that Wilder once exhibited four hundred varieties of pears before the Massachusetts Horticultural Society. It is probable that comparatively few varieties of apples were brought over in the early days and these were soon discarded in favor of seedlings originating in this country. Of varieties subsequently imported the majority have been found wanting.

In the early days apples were grown largely for cider and for this purpose a mixture of seedlings would answer after a fashion though for the finest product certain named sorts were soon found to possess superior merit. About 1850 the growth of temperance sentiment lessened the demand for cider and gave rise to the commercial production of apples for marketing in the fresh state. From this time on the study of varieties was directed towards the choice of the varieties best suited for this purpose. For many years this study went no further than the determination that this variety was desirable and that one undesirable, with no distinct realization that the good varieties were more successful in some locations than in others. It is said that nothing succeeds like success and this saying is exemplified in the widespread planting of those varieties whose merit seemed superior. Thus the Baldwin has been planted in places to which it is not adapted and where it

does not succeed the best. This has resulted in injury to the reputation of the variety. It is a fact that the prize winning Baldwins in the New England Fruit Shows of the past have generally gone to Massachusetts or Southern New Hampshire while Northern New England has frequently been successful in winning the highest honors in the competition in Northern Spy.

During the last fifteen or twenty years the study of varieties has languished. The cry has been that we had too many varieties and that we should restrict the number of commercial varieties to a very few. This is well and doubtless means progress. Great emphasis has been laid on cultural methods and this has resulted in material progress, yet we may find sound advice on cultural methods in the books of three quarters of a century ago, excepting only the practices of spraying and methods of packing and marketing. I would not minimize the importance of an exhaustive consideration of culture and marketing but it seems to me that this ought to include a careful consideration of the commercial value of varieties. A great many failures in orcharding may be traced directly to a wrong choice of varieties or to failure to modify the general orchard method to suit each of the several varieties grown. It requires only a casual survey of apple growing in the country as a whole to show that climatic conditions govern the distribution of varieties but the finer considerations are yet little understood. I have found as great difference in the average summer temperatures of two orchards in the same county in Massachusetts as there is between the average of Massachusetts and New Jersey where the lists of winter varieties grown are very different. This difference is due mostly to elevation. There prevails in the higher elevation the notion that apples cannot be grown as successfully as in the lower levels. This belief rests on the fact that the Baldwins do not succeed as well and in Massachusetts the success of the Baldwin is erroneously considered to be synonymous with the success of apple growing. I suspect the same is true in a measure in Vermont. Is there not a belief that the central and northern parts of the state are less favorable for orcharding, than the Champlain and Connecticut Valleys. What is needed is a different list of varieties for the different sections and then, so far as natural conditions go, apples may be grown as successfully here as there.

Largely through the work of H. J. Wilder formerly of the Bureau of Soils we have come to appreciate that, in order to secure the highest quality, color and productiveness we must pay attention to the soil preferences of varieties.

Good apple soils vary all the way from medium clay loams to medium or even somewhat light sandy loams but the range of desirable soils for any single variety is much narrower than this. Do we often consider this in selecting companion varieties for planting on the filler system? We need to know much more than we do now about the relation of different varieties to soils and soil conditions.

In discussing cultural methods we should give more consideration to the individual preferences of varieties. This includes not only soil management but also methods of pruning, harvesting and packing. We recognize that some varieties are more susceptible to certain disease than others and perhaps less clearly that insect pests have their varietal preferences. In this and in other cultural methods we need to differentiate more clearly what is best for the individual variety.

Finally we should consider that every large market takes more kindly to some varieties than to others. Before deciding what varieties to grow one should inquire in all available markets what varieties are preferred and why. This of course applies more especially to cases where one expects to ship in large quantities to the general market. If supplying a local market where one comes in close contact with it, one may influence its preferences to a greater or less degree.

May we at this point consider for a few minutes some of the qualities that a variety must possess in order to be desirable for commercial purposes. Let us take first the tree and afterwards the fruit, taking the various qualities somewhat in order of importance. I consider that the most important quality of a good variety is productiveness. Not only must it produce a large quantity of fruit but it is highly desirable that it bear regularly. The habit of bearing in alternate years is unfortunate though it may be overcome in some degree by wise cultural practices, notably by thinning in the year of a heavy crop. It is in the habit of bearing regularly and heavily that the Ben Davis and Baldwin excel while the frequent habit of moderate bearing is a fatal weakness of the Tompkins King and Golden Russet. The habit of coming in bearing at an early age is desirable for the time an orchard requires to reach the productive age is one of cumulative expense. It is said that such a variety is likely to lack vigor and be short-lived and this is probably true but it can now be overcome largely by the application of modern methods of orchard care. However, the great virtue in productiveness is to produce a liberal quantity in a period of years. The relation of productiveness to con-

dition of soil, climate and culture should be carefully considered.

The next most important quality of a good variety is adaptability or elasticity. Some varieties do well under certain conditions but they are not generally successful. I think that the J. H. Hale peach has demonstrated its superiority over the Elberta in the orchard of the originator but it remains to be seen whether it is able to succeed well under diverse conditions as does the Elberta. It is here also that the two leading varieties of apples Baldwin and Ben Davis excel. They succeed well under a wide range of conditions of climate, soil and culture, maintaining always their productiveness if not their quality.

I would place third the quality of vigor and longevity. This has been of rather more importance in the past than at present when trees are given better care and therefore have to withstand less. Nevertheless, a variety cannot be too vigorous unless it be at the expense of productiveness.

In some sections of the country hardiness or the ability to withstand winter injury is of prime importance. This is true along the Northern frontier of apple growing. If a variety frequently winterkills it is of course worthless. We know now that some of the trouble which has been attributed to winterkilling is due to specific diseases such as blight and cankers. Early maturity of wood shown by early formation of the terminal bud and early shedding of leaves is correlated with hardiness and is everywhere desirable and absolutely essential where severe winter weather prevails.

Next I would place resistance to insects and diseases. No variety is especially resistant to all insects and diseases. It may withstand some and be susceptible to others. Nor is it usual for a variety to be always entirely immune to any one insect pest though this may be practically so in some cases. Resistance to pests is not as important in our methods of pest control, but it will always cost money to spray and the less we have to do the better. The McIntosh was kept in the background for many years by its susceptibility to scab but the improvement in spraying methods together with the growing appreciation of fancy quality have elevated it to the position of a leading sort. Possession of great vigor usually means disease resistance so these two qualities are correlated to a considerable degree. Perhaps we may include here the ability to endure the application of spray materials without injury. McIntosh is less liable to foliage injury from lime-sulphur and arsenate than are Wealthy or Baldwin.

I would place sixth, good form and habit of tree. A variety that is very upright or spreading or dense in its growth means more perplexing questions in tree management, especially in pruning, than one that is less extreme in these characters. Here may also be included strength of wood and crotches, rendering the tree less liable to breakage under a heavy load of fruit.

Finally ease of propagation has played an important part in the success of many varieties. Some are more sure to grow from the bud or graft than others and some give a much higher percentage of first class trees than others, and it costs a nursery man no more to grow a first class tree than to grow a cull. When the nursery man influenced strongly through his catalog and agents the choice of varieties, he naturally encouraged the sale of varieties that gave him a maximum number of first class trees. This influence is much less now especially among commercial growers.

Passing now to the points that the fruit must have I would name as of first importance high quality. A few years ago this would have been challenged, but happily we are looking farther into the future now and realize that good quality means better prices and increasing sales and greater ultimate development of the industry even though the profits are for the time being a little less, which may or may not be true. The heavy plantings of the past few years have been almost exclusively of varieties that are classed as very good.

Second in importance is good color or attractive appearance. Expert pomologists all know that the appearance of a variety gives no indication of its quality though within the variety a handsome apple is likely to taste better than an unattractive specimen, though this is by no means always the case. Probably the consuming public has been educated to know that a red apple is not necessarily better than a green one but this education has not gone very far and it must be begun all over again with each generation. Always a variety of attractive appearance will enjoy a great advantage and it will be only rarely that an unattractive one will be able to entrench itself very firmly in public favor.

Next comes good shipping quality. We are learning to handle apples more carefully than formerly though there is yet room for further progress along this line. Few growers realize the close relation between skin punctures and decay. If you wish to demonstrate this, when you get home, take say fifty apples, each having its skin absolutely uninjured. Put half of them away just as they are and make a single

puncture of the skin on the others and put them away in another package. Examine them after a month or two and you will learn an impressive lesson. Good shipping quality is in a measure opposed to good table quality in that tenderness of flesh and skin is one of the elements of good quality and such an apple will not stand handling without danger of injury.

The fourth essential is good keeping quality. This is likely to be correlated with good shipping quality. A winter variety is more valuable than a summer or fall variety. This means that the full development of the fruit should occupy the whole summer and it should not mature until the cool weather of late fall is at hand.

In the fifth place I would put uniformity. By this I mean uniformity in size, form, color and season of ripening. I am not sure but this should be placed higher in the scale of importance. Lack of uniformity in ripening is an indication that the variety is not perfect in its adaptation to the climatic conditions under which it is growing; that it would do better where the summer is a little shorter and cooler. Uniformity of size and shape is one of the desirable characters of the Wealthy and one of the weaknesses of the Porter and Early Harvest.

I would place next desirable size. The market has limited use for an apple that is undersized, and while extremely large apples attract notice and excite comment, the demand for them must be limited. The real preference of the market is for apples from $2\frac{1}{2}$ to $3\frac{1}{2}$ inches in diameter.

Finally a good variety must be of good form, smooth and regular and neither too flattened nor too much elongated.

May we now consider the characteristics that are of commercial importance of a few of the leading varieties of New England. We will select the principal varieties which according to the yearbook of the Department of Agriculture produce the bulk of the commercial crop of this region.

We have first the Baldwin which forms 15% of the commercial crop of Vermont, 48% in Massachusetts, 52% in New Hampshire, 42% in Connecticut, and 35% in Maine. In New York it forms 31% and in Illinois 3% of the commercial crops. These figures indicate fairly well the region where it succeeds best, viz. southern New Hampshire and Massachusetts, west through New York to Ontario to Lake Michigan and south into northern Ohio and the elevated sections of Pennsylvania and northern New Jersey. I do not consider it desirable for planting in Vermont except on low elevations in the southern part of the state.

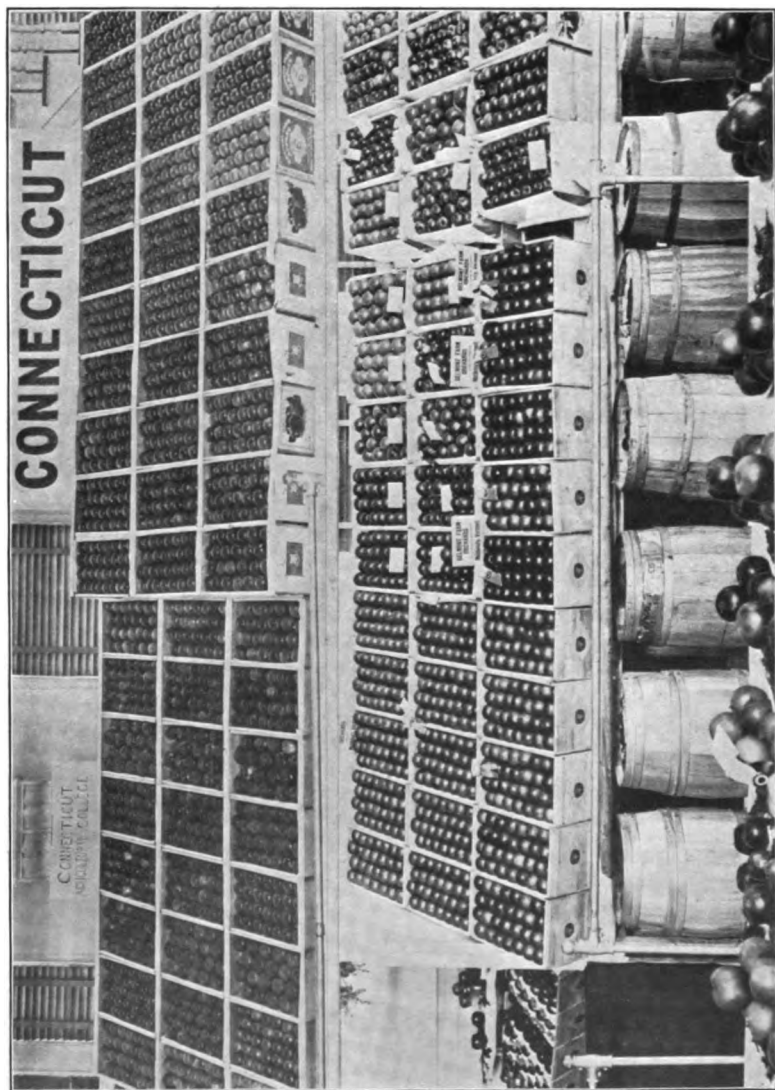
Next we may consider the Rhode Island Greening which forms 13% of the crop in Vermont, 9% in Massachusetts, 6% in New Hampshire, 17% in Connecticut, 4% in Maine. It forms 15% of the crop in New York and 1.2% of the crop in Illinois. The climatic range of the Rhode Island Greening is similar to that of the Baldwin, but lies rather more to the north. Unlike the Baldwin it succeeds well in Vermont wherever it does not winter kill, which is likely to be only in the more elevated portions of the central and northern part of the state. The best soil for this variety is medium or light clay loam or a medium loam with a somewhat heavier sub-soil. This soil is quite different from the Baldwin being considerably heavier and containing a larger proportion of clay. Care should be taken that the soil is well drained in order to lessen the danger from winter killing. It is unwise to plant the Greening in a narrow valley or anywhere that air circulation is poor owing to the fact that under such circumstances sooty fungus and scab are especially troublesome. It is a variety which should usually be cultivated. The advantage of higher color which results from sod orchards is of little or no value with the Greening. Rhode Island Greening is called for in the New York market more than in our New England market. It is rarely exported. It is considered primarily a culinary apple. It is not by any means unaccessible for table use. It is not an apple for box packing or for any other type of small package, but is exclusively a barrel apple.

As already indicated it is considerably subject to scab, particularly the late form developing in August or September or even in storage, and also of the sooty mold. In addition to taking precautions in selecting sites this trouble may be checked by thorough spraying, especially during mid-summer and by keeping the head of the tree well open in order to promote air circulation. When stored the Greening is considerably subject to scald. In order to prevent this care should be taken to see that the apples are well ripened on the tree before they are put in storage and then at the right point are picked and stored quickly.

The Northern Spy forms 12% of the crop in Vermont, 5% in Massachusetts, 5% in New Hampshire, 7% in Maine, 13% in New York and 1.4% in Illinois. The climatic range of the Northern Spy is very similar to that of the Rhode Island Greening. It is about the most desirable winter apple for Vermont. In Massachusetts and southern New England it is variable in its behavior. Under favorable conditions it does as well as it does in northern New England but many times it does not do well. It is hardy under nearly

all conditions and yet it occasionally winter kills in the severe climate of northern New England. The tree is vigorous and long lived, upright in growth and makes a somewhat dense head. Its soil requirements are quite exacting. It should have a medium loam neither too heavy nor too light. Care should be taken to see that the sub-soil is of a similar nature. One should pay particular attention to the soil requirements of this variety before planting it extensively. It is primarily a table apple and should usually be boxed. When packed in barrels it is apt to become seriously injured from bruises and when bruised it decays quickly. It is somewhat subject to the fungus fruit spot and also to the physiological spot. Neither of these troubles are so severe as on the Baldwin. It occasionally scabs, but this trouble is not serious if the tree is planted where air circulation is good and the head not allowed to become too dense. It does not seem to be injured by the codling moth as severely as some other varieties. It ought to be one of the main varieties for Vermont where it is desired to grow fancy apples.

The McIntosh Red forms 6% of the crop in Massachusetts and in Vermont, 4% in New Hampshire, 3.7% in Maine, 1.6% in New York. These figures by no means represent the probable relative commercial importance of this variety in the future as the planting has been very heavy during the past few years. While one will find occasional dissenting voices it is generally agreed that this variety is the highest quality of any apple grown. Not only is it good for table use, but one of the best for baking and for apple sauce. Adding to this its high color and fine texture and good habits of tree it is a very desirable variety. It is adapted to much the same range of territory as the Northern Spy, but I believe it to be somewhat hardier in tree. Also the fruit will mature in a somewhat shorter season. It has been heavily planted all through New England and the production in Massachusetts during the next few years will be greatly increased. I do not think this need to alarm the planter in Vermont because the apples from this section of New England will come into the market later than those from further south. At present the McIntosh is a Christmas apple, but there is no reason why its season should not be prolonged into January, February and even early March. In supplying this later market northern New England will have the advantage. The tree is vigorous with a moderately thick head but generally of excellent habits. It is reasonably productive and regularly an early bearing tree. In Massachusetts it requires two or three pickings



DISPLAY OF APPLES AT THE NEW ENGLAND FRUIT SHOW, MONTEPELIER, NOV. 1916.

in order to get the fruit all at the proper stage of maturity. This is probably of less account in Vermont, and yet in many cases at least two pickings would be found worth while. Soil preferences seem to lie around a medium loam or fairly rich sandy loam. The most serious drawback to the McIntosh, and one which held it back for many years, is its susceptibility to the apple scab which affects both fruit and leaves. No one should plant the McIntosh who is not prepared to spray thoroughly. The McIntosh never ought to be packed in barrels. It is an apple for the bushel box or some other small package. For anyone in Vermont who wishes to grow fancy apples and who knows how to do it there is no more desirable variety than the McIntosh. I do not fear any over production of first class apples of this variety and it will do more to extend the apple market than any other which has appeared in recent years.

The Ben Davis forms in Vermont 6% of the commercial crop, 10% in Maine, 5% in New York and 38% in Illinois. The reversal of the figures for Illinois and for the eastern states show where the proper home of this variety is. It does not succeed well in New England and the only use for growing it is its productiveness and the fact that it is very well known in the market. It is of low production and sells at a fairly good price, but when apples are plenty it is considerably discounted in price. The tree is healthy and vigorous and fairly free from disease and I believe there is no variety known that will produce more heavily under a greater variety of conditions. It is the best known of any variety in the market unless it is the Baldwin but of late years people are learning to know its inferior quality and a prejudice against it is growing up. Whether this prejudice is well founded is somewhat a matter of personal opinion but it will be bound to discriminate more and more against this variety in the future. It should not be planted in New England unless under exceptional circumstances.

Fameuse forms in Vermont 8% of the crop, 3½% in Maine, 2.4% in Illinois. This variety was formerly considerably grown in this state but is now being replaced by the McIntosh. It is superior to it in most respects. The McIntosh seems to possess great elasticity of constitution and succeeds in a wider range of conditions. Fameuse is less subject to scab perhaps, but its small size is decidedly against it.

Gravenstein forms 6% of the crop in Massachusetts 2.3% in Maine. In Vermont it evidently does not form sufficiently large percentage of the crop to note special mention. Gravenstein is an excellent apple both for table and kitchen

use. In fact no variety fills both these requirements any better: Its climatic range is much the same as that of the Spy and Greening and is limited on the north by danger of winter killing. The tree is almost ideal in its habits of growth but often times just as it comes into full bearing it dies evidently from winter injury. If one grows this variety great care should be taken to see that the wood matures well in the fall. One should avoid severe pruning and an over supply of nitrogenous manure. It does not produce quite so heavily as we would like to have it but still under favorable circumstances it cannot be said to be unsatisfactory in this respect. Especially in southern New England it drops rather badly and requires two or three pickings. Many growers mulch heavily under the trees and allow the fruit to drop, gathering it from the ground and marketing it promptly. Soil requirements are a medium sandy loam, well drained and not containing too much nitrogen or readily available organic matter. It suffers little from fungus diseases though it occasionally scabs where spraying is not diligently followed.

Yellow Bellflower forms 4% of the crop in Vermont and 1.7% in Maine. I do not suppose this variety has been very much planted in recent years. It is variable in size and form, is a good cooking apple and is liked for table use by those preferring a somewhat acid apple. While not a red apple it is very handsome when mature. It has a fairly good form sometimes becoming rather dense especially if the soil is rich. The long branches droop over to the ground but rarely break. Its most serious drawback is the ease with which it is injured from handling. It is said to be especially in demand in the Chicago market and sells rather slowly in most of our eastern cities. It is somewhat subject to scab. I do not suppose this variety has been planted much in recent years and I look for its general disappearance from New England orchards.

Wealthy forms 5% of the crop in Maine but is not mentioned for the other New England states. Probably the production is low but it has been heavily planted in recent years especially as a filler for which purpose it is highly desirable. The tree is of good habits, comes into bearing very early, is hardy and very productive. The fruit is of good size and remarkably uniform in shape and size. I do not know any variety that when well grown will grade out better than the Wealthy. It succeeds best through the same range as the Spy and Greening but is more hardy in withstanding severe winters. With age of tree the fruit becomes rather small. When used as a filler it will usually

be cut out before this fault appears. If it is desired to hold up the size it can be done by cultivation and moderately liberal fertilization. It is an apple that ought to be packed in a box or other small package rather than in barrels on account of its delicacy of flesh. The soil requirements are a medium loam. It is pretty fairly free from diseases although the leaves are easily injured by spray mixtures which for any reason are apt to cause foliage injury. I think this should be one of the leading varieties for northern New England and I look to see it occupy a larger place in the market as time goes by.

Wagener is an old variety which is being planted somewhat in recent years especially as a filler. It comes into bearing early and is very productive and vigorous while young. With age it loses vigor and becomes really an unthrifty tree. It is in special favor in Michigan but for New England it should not be planted unless as a filler. For this purpose it possesses one merit which other filler varieties do not have, namely that it is a winter apple. It is probable that the heavy planting of orchards on the filler system in recent years will result in a greatly enlarged production of early apples. Soil requirements are much the same as that of the Spy and there are many arguments which could be advanced in favor of planting it as a filler along with that variety. It is fairly free from insects and diseases. The most serious trouble is the scald in storage. On this account care should be taken to see that this variety is well matured before going into storage and that it is picked and stored promptly.

There are many other varieties which might be considered in this connection but I believe I have included in this list those that are of the greatest value for Vermont orcharding. Unless one is planning to supply local markets the list of varieties of any grower should be limited. Not more than two or three varieties should be grown. It is easier to sell a car load of apples in the market than ten barrels and they can usually be disposed of to better advantage. Probably the large orchards of Vermont could confine themselves to four varieties with advantage to the business. I believe these four varieties would be Northern Spy, Rhode Island Greening, McIntosh and Wealthy. The last variety being used exclusively as a filler. I believe these varieties to be the big four for Vermont. In the colder portions of the state where winters are especially severe it would probably be wise to substitute other varieties for the Northern Spy and Rhode Island Greening. The Wealthy and McIntosh should be hardy anywhere in the state. Given the proper

varieties and good methods of culture and an aggressive and up-to-date system of marketing I believe that Vermont can compete with the world in apple production.

FEDERAL AND STATE AID IN IMPROVING MARKET CONDITIONS.

**C. J. BRAND, CHIEF FEDERAL BUREAU MARKETS,
WASHINGTON, D. C.**

The problems of agricultural marketing came into existence on the same day that agricultural production began. While production was carried on for the sole benefit of local and restricted groups, crop disposal was a relatively simple matter. There were no outside markets and only sufficient areas of the various products desired were planted to supply a definite and well-known population. In later times, with the growth of population and general advancement in civilization, including especially the means of transportation, production at a distance from the point of consumption has become the rule. This change in the situation has accompanied the growth of modern industrialism and the collection in definite areas of huge populations of nonproducers of foodstuffs and other necessities of life.

In recent years, depending upon the acuteness of the problem in the particular country, governments and peoples have been forced to give attention to more economical and efficient methods of transferring food products in particular from the producer to the consumer. In the case of staple products like wheat, corn, oats, barley, cotton, wool and some other products, rather well-defined marketing systems have been developed. Semiperishable products have not received the attention that staple products have received, while perishable products have suffered still more in comparison through lack of a definitely planned system of marketing and distribution. That this is the case is only natural when the character of the products is considered. The great necessities of the people are either staple or semiperishable, if we include among the latter such food products as meats, butter, poultry and eggs. It is in the class of very perishable products such as fruits, vegetables, milk and the like that the most serious and difficult problems have arisen. The time has now come when so large a part of our population depends for its sustenance on products produced at distant points that every factor which tends to add addi-

tional cost, loss or waste is being subjected to scrutiny on account of the high prices that practically all commodities now command.

The problems of marketing and distribution in a country like England, where that part of its production that is grown at home is at a relatively short distance from the consuming markets and where transportation facilities are developed to a very high degree, is far simpler than the problems of Russia where the consuming metropolitan populations are few and in many cases located at great distances from the producer, and where transportation facilities are relatively undeveloped, or even in the case of the United States where with relatively well-developed transportation facilities and production specialized as to area, the products must be transported several thousand miles to the greatest population centers.

Climatic conditions have the most profound influence in determining production areas. Soil and economic conditions play a part, but not so important a one as climate. The food habits of our people as they have developed demand a great variety of products. California and Florida in a commercial sense are the only areas suitable for satisfying the citrus fruit requirements of our people. The consumer's demand for strawberries results in a succession of production, in order that the market may be supplied as continuously as possible, that begins in Florida then follows in Louisiana, Mississippi, and Texas, and almost before the season in these States is closed, it begins in Arkansas, Tennessee and the Carolinas and finally in the East, where the great consuming centers are located, passes through Virginia, Eastern Shore of Maryland, Delaware and New Jersey, the latter producing the latest, in great commercial quantities. Similarly with other products which the consumer demands. The first cantaloupes of the season are produced in the very hot climate of the Imperial Valley of Southern California, many feet below sea level. A normal crop of from 4,000 to 5,000 cars moves from that area in about one month. Before it has all been marketed, Arizona begins to supply the market, then follow Nevada, and California. Then there is a break in western cantaloupe production, while certain eastern sections, notably the Carolinas and Georgia, furnish a certain supply. Then follows a time when the markets of the United States are relatively bare of a commercial supply of cantaloupes shipped from other areas. At the expiration of this time, a great cantaloupe territory in Southern Indiana supplies the East to a certain extent and the Middle Western territory more large-

ly, and close upon its heels follows the well-known crop from the Rocky Ford territory in Colorado.

The interdependence of the producer and consumer in the distant market has now become so marked that it may truthfully be said that both are calling for improvement in marketing and distribution conditions; the one in order that he may receive certainly the cost of production and a reasonable profit on his investment and labor; the other in order that he may purchase the necessities of life and a suitable portion of its luxuries at prices that are reasonable in comparison with what the producer receives. In passing it may be said that it is perhaps true that the ultimate desire of neither class is likely to be fully satisfied. Nevertheless, improvement is possible and both classes may readily be beneficiaries if in no other way than through the elimination of loss and waste. Apparently the acuteness of the problem has grown more rapidly than has the power of private initiative to deal with it successfully. The result has been that Federal and State governments have been called upon very largely to assist in working out a solution if possible. The demands of the public have found voice in various ways. It finally resulted in legislation in certain respects by the Federal government and also by State governments and additional work under administrative authority without specific legislation. The Federal government was probably the first to take definite action. After various preliminary pieces of legislation authorizing the investigation of the cost of food supplies at the farm and to the consumer, and authorizing the investigations of systems of marketing farm products cooperative and otherwise in practice in the various sections of the United States and the demand for such products at the various trade centers, a specific appropriation was made by Congress in 1913 to enable the Secretary of Agriculture to acquire and diffuse among the people of the United States useful information on subjects connected with the marketing and distribution of farm products. The Act making this appropriation was passed on March 4, 1913, and \$10,000 were made immediately available for expenditure between that date and the 30th day of June. On the 15th of May, Secretary D. F. Houston announced the establishment of a separate unit within the Department of Agriculture to be known as the Office of Markets. Work on the outlining of plans and the laying out of work was taken up immediately, and eight distinct marketing projects were initiated.

Subsequently Congress appropriated \$40,000 for conducting investigations of rural organizations for other pur-

poses than marketing, especially those intended to improve rural credit, insurance and communication. Under this appropriation two additional projects were established in August, 1914.

The development of several of our original projects resulted in new activities and new projects, which were established as outgrowths of our original lines of work. The passage of the Cotton Futures Act resulted in the establishment of several projects necessary to the effective administration of that Act. The Agricultural Appropriation Bill for the fiscal year 1917 provides for the establishment of three new projects, and the administration of the United States Grain Standards Act, passed by the last Congress, which will be administered cooperatively by the Bureau of Plant Industry and the Office of Markets and Rural Organization, has made necessary the development of six projects concerned with that work.

After mentioning the marketing work of other bureaus of the Department, or work which is so closely related to marketing as to be a more or less essential part of it, the activities conducted by the Office of Markets and Rural Organizations will be discussed in some detail.

BUREAU OF ANIMAL INDUSTRY.—The Bureau of Animal Industry at an early date studied certain phases of the marketing of butter, milk, cheese and cream. Since the establishment of an Office of Markets, purely marketing activities of the Dairy Division of that Bureau have been transferred to this Office, but close cooperation is practiced between the two branches of the Department. Necessarily much of the work connected with the enforcement of the Meat Inspection Act has a profound influence upon the marketing of meat products, and the Bureau of Animal Industry also enforces the 28 hour law governing the transportation of live stock.

BUREAU OF PLANT INDUSTRY.—The production bureaus of the Department, before the establishment of a separate marketing unit, wisely developed those phases of marketing and distribution work for which there seemed to be acute demand. Among the most significant of these activities were the fruit handling, transportation and storage investigations inaugurated by Dr. W. A. Taylor, now Chief of the Bureau of Plant Industry, assisted by Mr. G. Harold Powell, who is now the General Manager of the California Fruit Growers' Exchange, perhaps the largest successful cooperative marketing enterprise in the United States. These investigations are conducted by the handling of fruit from regions and orchards selected for the determination of

special problems. Fruit is picked, packed and shipped under the immediate supervision and direction of the Bureau's representatives who control every detail of the handling of the product. In this way very important improvements have been accomplished through the devising of precooling methods which have resulted in a saving of millions of dollars particularly to the citrus fruit industry, and through the improving of methods of handling fruits and vegetables.

Another activity of the Bureau of Plant Industry primarily related to marketing deals with the standardization of grain. This work has for its object the establishment of definite grades for the various grains based upon intrinsic value; the study of the effect upon grade of farm methods of harvesting and handling; methods of handling and grading grain at country elevators and terminal markets; study of the quality and condition of American export grain, as well as grains imported into the United States, including the investigation of deterioration of grain during transit, in steamships, cars, and in storage; the mixing of varieties; and dockage as a factor in grain grading. This work is very closely related to the grain marketing investigation of the Office of Markets and every attempt was made to so articulate it as to avoid duplication of work and expense. The work is now consolidated as a result of the U. S. Grain Standards Act and is conducted jointly.

This Bureau also enforces the seed importation Act of August 24, 1912, which is legislation affecting both marketing and production.

BUREAU OF CHEMISTRY.—Many features of the enforcement of the Food and Drugs Act have a definite bearing on marketing, and the poultry and egg investigations of Dr. Mary E. Pennington under the Bureau of Chemistry furnish one of the strikingly effective lines of marketing and distribution work developed by the Department. The Bureau of Chemistry also carries on investigations in the grading, weighing, and handling of naval stores.

BUREAU OF CROP ESTIMATES.—Much of the work of this Bureau is very intimately related to marketing and distribution, handling as it does crop estimating and reporting with reference to crop areas, crop conditions and forecasts, crop damage, total crop production, farm prices and values of live stock and other crops, together with the compilation of foreign crop data in cooperation with the International Institute of Agriculture at Rome.

STATES RELATIONS SERVICE.—This bureau of the Department, through the system of county agents which it

supervises in cooperation with the extension services of various States, comes into close contact with marketing problems in a great variety of ways.

The problems confronting the average county agent in connection with the marketing of agricultural products within the territory he covers are so numerous and of such a conflicting nature in many instances that considerable study is necessary in order to be able to advise farmers properly. He is called upon to give advice with reference to so many different products and so many different problems that extreme caution is necessary. This is particularly true with reference to cooperative organizations which he is called upon to assist in forming. Organizations should be promoted only in such communities and under such conditions as warrant an expectation of success. The producers must be taught to handle their own enterprise from within if they are to be successful. The States Relations Service is assured of complete cooperation in the furnishing of services of specialists of the Office of Markets and Rural Organization wherever the force available makes it possible in dealing with the problems that come before it.

THE WORK OF THE OFFICE OF MARKETS AND RURAL ORGANIZATION.

GENERAL OUTLINE OF WORK.—The work by the Office of Markets and Rural Organizations is divided into the following main subdivisions: Marketing and distributing farm products; rural organization investigations; investigations and demonstrations of cotton standards and cotton testing; and the enforcement of the United States Cotton Futures Act. Three new paragraphs have been inserted in the appropriation bill for the current fiscal year, that is, 1917, to provide for a telegraphic market news service on fruits and vegetables, a market news service on live stock, meats, and animal by-products, and to enable the Department of Agriculture and the several States by the joint employment of agents to cooperate effectively in the study and improvement of methods of marketing and distributing farm products. This Office also is charged with the administration of the United States Warehouse Act, and in cooperation with the Bureau of Plant Industry of the Department, with the enforcement of the United States Grain Standards Act.

The description of the work of the Office as a whole has been given or printed so often that the mere names of the different subdivisions of the work will be given here, follow-

ed by a more detailed description of those recent activities of the Office of Markets and Rural Organization which have been productive of definite results to the farmers of the country.

The several specific projects which have been developed are:

- Cotton Handling and Marketing,
- Cooperative Purchasing and Marketing,
- Market Surveys, Methods and Costs,
- Market Grades and Standards,
- City Marketing,
- Transportation and Storage,
- Marketing Business Practice,
- Marketing by Parcel Post and Express,
- Marketing Live Stock, Meats and Animal By-Products,
- Marketing Dairy Products,
- Marketing Grain, Seeds and Hay,
- Marketing Cotton Seed and Its Products,
- Cotton Warehousing Investigations,
- Rural Credit, Insurance and Investigation,
- Rural, Social and Educational Activities,
- Investigation and Demonstration of Cotton Standards,
- Cotton Testing.

In the administration of the Cotton Futures Act the following projects have been developed:

- Determination of Disputes,
- Investigations of Future and Spot Markets,
- Preparation and Distribution of the Official Cotton Standards.

SOME DEFINITE RESULTS.—The activities of the Office of Markets and Rural Organization in connection with the collection and dissemination of information relative to the marketing of farm products have been so manifold that practically every phase of the commercial side of the industry has been given consideration. Studies of the problems relating to the marketing of the staple American crops have been conducted simultaneously with an experimental market news service covering the more important fruit and vegetable crops, and the whole has constituted a comprehensive survey of the movement and distribution of farm products.

CO-OPERATIVE MARKETING.—There has been a constant demand for information and assistance looking toward co-operation between producers of farm products, especially in the marketing of the crops. Growers in many sections of the country have received definite advice and instructions in connection with the formation of farmers' co-operative

associations and many such associations which were in operation have been assisted toward more effective organization and work. Among many other such groups assistance has been given to the strawberry producers of Louisiana, the grain growers of the Middle West, the potato growers of Maine, the fruit and vegetable growers of the Carolinas and to the apple growers of the four Northwestern States.

GRADES AND STANDARDS.—One fundamental question which has received consideration has been the promulgation and establishment of grades and standards for agricultural products. Tentative grades for sweet potatoes of Arkansas have been worked out and have been adopted by many of the growers of Arkansas. Tentative grades have also been recommended for the Bermuda onion crop of Texas and were approved at a meeting of growers and dealers at Laredo, Texas. Field demonstrations of grading and packing these commodities have been made and extensive studies are being conducted, with a view to working out grades for other agricultural products.

CITY MARKETING INVESTIGATIONS.—Several cities have asked for assistance in solving the municipal market problem and the Office of Markets and Rural Organization has given help in a number of cases. Representatives of this Office have advised with city councils and other civic organizations regarding suitable locations, nature of buildings, and cost of construction. Rough plans of model municipal markets have been submitted with recommendations of methods of procedure.

MARKETING BY PARCEL POST.—The investigations and demonstrations in experimental shipping of farm products by parcel post indicate that it is possible to ship almost any commodity by parcel post, providing it is packed and handled according to postal regulations. However, in order to achieve success and satisfaction in the shipping of farm products it is necessary for the producers to grade and standardize their products and to use suitable containers.

MARKET BUSINESS PRACTICE.—A uniform system of accounts has been developed for each of the following enterprises: Primary grain elevators, farmers' cooperative elevators, country creameries, live stock shipping associations, fruit and produce associations, marketing agencies, commission houses, and cooperative stores. Over 500 country grain elevators are now using the accounting system devised by the specialists of this Office and the other systems are either in active use by various firms or are being tried out experimentally in business houses with a

view to slight alterations if this practical test shows such changes to be necessary.

The vital problems involved in the marketing of live stock and distribution of meats were the subject of the discussion and were given active consideration by the various representatives of the industry. Assistance and advice have been given to various communities in which slaughtering enterprises have been contemplated, including municipal abattoirs and cooperative meat packing companies. Directions have been issued in bulletin form for the organization and operation of co-operative live stock shipping associations.

STUDIES IN RURAL CREDIT.—Investigations were conducted by the Office of Markets and Rural Organization regarding credit facilities for farmers and much information was obtained which was of value to Congress in the framing of the recent farm loan Act. Further studies will be conducted with a view to improving and developing possible sources of farm loans.

NEW LINES OF WORK.

MARKET NEWS SERVICE.—As an outgrowth of the experimental market news work which has been conducted by this Office during the past two years, there has been inaugurated a market news service which covers the commercial movement and prevailing market prices of the principal fruit and vegetable crops of the United States. During the current year daily reports have been issued on onions, strawberries, tomatoes, cantaloupes, peaches, grapes, and watermelons, and at the present time reports are being issued on apples and white potatoes. Each morning telegraphic reports are received from railroad officials throughout the country which give the commercial movement up to midnight of the previous day. Permanent branch offices have been established in New York City, Boston, Buffalo, Chicago, Cincinnati, Kansas City, Minneapolis, Philadelphia, Pittsburgh and St. Louis. Temporary arrangements have also been made for receiving daily telegraphic reports from Cleveland, Columbus, Denver, Des Moines, Detroit, Indianapolis, Milwaukee, Omaha, Sioux City, and the twelve principal southern markets.

Telegraphic messages received from the various markets give receipts, prevailing jobbing prices, general quality and condition of commodities from each important commercial shipping district, general market conditions, and

general weather conditions prevailing that morning on each market. Blanket telegrams are prepared in Washington covering all available information, which are sent out to all city branch offices and to representatives who are stationed temporarily in producing territories. Thirty-eight such temporary field stations have been located in producing territory during the past season for periods varying from three weeks to two months according to the local crop movement. In both field and city offices bulletins are prepared and distributed by mail or messenger to all who express a wish for the service. The mailing lists represent growers, shippers, distributors and consumers. A telegraphic or a telephone service is maintained for any persons or organizations who will pay the expenses of these messages. The information disseminated in connection with this service has been valuable in the establishment of fair f. o. b. prices at shipping points, in assisting shippers to avoid glutted markets, in making it possible for growers to check the returns made by commission merchants, presenting relative values of offerings from competitive areas, in furnishing a basis for the equitable adjustment of damage claims and in keeping the cities advised of local supplies and prevailing wholesale prices.

This news service is to be extended during the present fiscal year to include live stock, meats and by-products, under a provision in the appropriation for this year.

STATE CO-OPERATION IN MARKETING WORK.—The Office of Markets and Rural Organization during the fiscal year of 1916 paid a portion of the expenses of marketing agents located in certain States. These agents, in co-operation with State authorities, conducted extension work in marketing and distribution, and in some cases, rural organization as well. An item has been inserted in the agricultural appropriation bill for 1917, appropriating \$35,000 for the extension of this work, which will be carried on in co-operation with those States which appropriated money for marketing purposes. The agents employed will maintain headquarters in the various States concerned and their salary and expenses will be borne jointly by the Federal Government and the States. It is expected that this service will function as a clearing house among the States and between them and the Federal Department of Agriculture for all general and specific information in regard to the marketing of farm products, and that through its instrumentality, uniformity and comprehensiveness in marketing policies may be developed to the advantage of all.

INVESTIGATIONS IN FOREIGN MARKETS.—Another promising new line of work is that with foreign markets. Plans have been worked out for the investigation of foreign markets for American farm products and for the development of the export trade in these products. These plans include the continuation by investigation and study of the demand for these products in foreign markets and by a study of their present disposition in those markets.

A representative of the Office of Markets and Rural Organization has been in Europe all summer for the purpose of inaugurating this work in a preliminary way. He is studying actual and normal conditions in European markets in so far as they relate to American farm products and of their customs, preferences and consuming capacities. The representative is conferring with consular offices of the State Department, with commercial attaches of the Department of Commerce, and with import agents and foreign dealers. Close co-operation in this work will be maintained with the Bureau of Foreign and Domestic Commerce of the Department of Commerce and with other agencies which are interested in the development of foreign markets for the surplus farm products of the United States.

OVERHEAD IRRIGATION.

S. HARGREAVES, VT. EXP. STATION, BURLINGTON, VT.
(Abstract from a Demonstration.)

None would doubt for a moment that the expenditure of \$100 to \$150 per acre for an irrigation system would pay for itself during the past season on truck crops, where the loss had been anywhere from \$100 per acre upwards. An acre of potatoes, for instance, should have produced around 300 bushels, while it is safe to say that, in general, the yields have been from 25 to 50 bushels on account of the drought. Given 300 bushels, a moderate yield for a good grower, and the present price of about \$1.50 per bushel, it takes but a common school education to figure the profits from irrigation and the supply of normal moisture in the soil. It should be remembered that such a system is good for 10 to 20 years and in that time will pay for itself many times over.

Overhead irrigation systems generally consist of running the water over the field in pipes suspended on stakes. The water is distributed through small nozzles screwed into

the pipe and falls to the ground in drops similar to natural rain. This is very desirable when the drops are small because the surface of the ground is not packed in the process, the water soaking into the soil very gently, and without washing the land.

The demonstration was of three systems of overhead irrigation manufactured by the following firms: The Skinner Irrigation Co., Troy, Ohio; The Manaway System, C. W. Skinner, Newfield, N. J.; and J. P. Campbell, Jacksonville, Florida. The Skinner and Manaway systems are similar, excepting important differences in nozzle types and in the union. The Skinner method of turning the pipe lines from a central point is a special feature. The Campbell Turbo-irrigation is distinct from the Skinner and Manaway in that the water is distributed through a tube which is oscillated by means of a miniature water turbine. These machines are attached to stand pipes placed about 50 feet apart, which are themselves connected with underground feed pipes.

APPLE DISEASES AND THEIR CONTROL.

PROF. B. F. LUTMAN, U. V. M., BURLINGTON, VT.

The one point I wish to emphasize this morning is the dependence of apple diseases, and of all plant diseases, on the weather.

Plants have to take the weather as it comes and withstand it, or die. They are rooted to the spot. Resistant varieties may be selected,—sorts that will grow well in our climate, but still they may break down under adverse conditions. Varieties may stand up well for 20 years and then there will come a period for which they are not fitted and they will be severely injured in fruit or foliage or trunk. The injury may be permanent or it may only be of importance for the year in which it occurs. Usually fruit and foliage diseases, unless they occur for a number of successive years are not permanent in their effects. Injuries to the bark of the trunks and branches are more lasting even if they only are found in one season.

These diseases brought about by adverse conditions at some time or other during the growing season are well shown in those that have occurred in 1913, 1914, 1915 and 1916. Two years ago, the serious difficulties that the apple tree had to meet in the Champlain Valley particularly, was

a lack of water in the early portion of the growing season. A change in the fruit was the first evidence of this need. Spots appeared on the surface of the apple, not deep nor discolored; pithy apples; pithy spots in the apples and possibly, gnarly apples. No parasite, insect or fungus was the cause so far as could be determined; the apple tree was simply unable to supply the necessary moisture to properly fill out the fruit. Some cells in the pulp had to remain empty.

This effect on the fruit would not have made a permanent injury to the tree if they had not been continued through two or three successive years. The next portion of the tree to suffer was the foliage, the leaves in 1915 on many trees withered in May and June and foliage buds never fully opened. With the death of the leaves, that of the smaller branches and then the larger branches, followed. The result was that, finally, the trees stood without fruit, with but little foliage and with half or more of the branches dead or dying.

Cultivation of the soil might have prevented to some extent this extreme condition but on exposed land with shallow rooting systems, it is very questionable whether it would have retarded the progressive advance of the death of the trees. The soil had no moisture in it when the season opened and with the absence of the early spring and summer rains which we usually expect, there was probably not enough in the soil to tide the trees over such an unusual strain on their moisture gathering ability.

The season of 1916, reversed this distribution of moisture and during May and June, it seemed as though the flood gates had been again raised. For almost two months, hardly a day passed without some rain. The trees took on a brighter green. The words of the Vermont poem "Up where the trees grow a little greener" were literally true. Visitors to the state, men who come here year after year, marked and commented on the richness and greenness of the foliage, not only of the apple but of the forests as well.

Unfortunately, such long continued periods of wet weather bring other troubles:—the fungi. The apple scab is not bad in dry years, but continued rains during the growing season give it a chance to mature and spread its spores; to germinate them in new places in the drops of moisture and to penetrate the leaf or fruit to make new scab spots. June and early July were ideal for the production of scab in Western Vermont; the favorable conditions were continued in many parts of the state, throughout July. The result has been that many growers were

caught unawares and the crop needed to go into the seconds or culls. It is never safe to assume that these fungus diseases are dead—they were only resting; waiting for the favorable conditions that will give them a chance to break forth again into an active state. The only way to avoid their attacks is to meet them on their arrival. There is an old saying:—

“Twice is he armed who hath his quarrel just,
But thrice is he, who gets a blow in fust.”

When these fungi arrive, they must be met by apples foliage and fruit well covered with a fungicide that will prevent the germination of their spores or the entrance of the germ tubes which come from the spores. Most growers use lime sulphur, 1-40, for these fungus troubles on fruit. To this is always added arsenate of lead, 3-4 pounds of the paste, for insects. The time of application is an important point. The scab fungus originates in the spring from the fallen leaves that had been infected the previous year. This is an argument for plowing them under. The first spores appear about the time the buds burst and there should be an application at this time; after the fruit is formed and the petals have fallen from the blossoms is a time of danger for the fruit. It should be covered again and the foliage as well, so that the disease may not get started the initial infections,—primary infections, are the ones to control. If the disease actually appears on the leaves or fruit, it is too late to spray; the fungus is in and at work. The whole problem is to keep it from getting in.

The number of sprayings necessary after these first two, will depend entirely on the weather. Last June, it should have been done almost every day when we had no rain. It only takes about a half an hour for the spray to dry; even if the weather does look gloomy the proper thing to do is to spray. Even if some of it does wash off there is no great harm done, nothing such as may be done if the scab fungus gets a start; it is only a little spray material and time lost, and a barrel of seconds will pay for that. In spraying season, the thing to do is to spray.

The New York station at Cornell has been working on sulphur dusting instead of lime sulphur; 90 parts of flowers of sulphur and 10 parts of dry arsenate of lead are blown over the foliage. This method is applicable in very rough places where a spray cart could not go successfully. It is claimed that this mixture sticks fairly well even in hard rains. It is questionable to me as to the practicability of lime sulphur in a very bad season. I should pin my faith

to a weak bordeaux mixture even if there were a little scorching of the fruit. Anything that will kill the fungus is likely to injure the foliage and fruit. 2-2-50 bordeaux would probably be more fungicidal than a 1-30 lime sulphur and there would be no more danger of injury. The copper compounds cannot be beaten when it comes to combating fungi.

BOYS' AND GIRLS' CLUB WORK.

(STEREPTICON.)

E. L. INGALLS, STATE CLUB LEADER, BURLINGTON, VT.

Boys' and Girls' Club Work is a distinct part of the Co-operative Extension Work in Agriculture and Home Economics. It runs parallel to the work of the County Agent, the Farm Demonstrator, and the Assistant in Home Economics; and, like these other arms of the service, it has both state and Federal support. Primarily, it has to do with the home activities of boys and girls resident in rural communities. Club Work comprehends a systematic effort to organize young people under the leadership and supervision of older people, and to have them carry out a definite program to definite achievement.

Club work on the nation-wide basis is in its third year. It is organized in every state in the Union; and, in each state, it is directed through the State Agricultural College. Last year in the United States at large, there were enrolled in all projects over 200,000 members. Most of these were engaged in home and market gardening, canning, poultry for egg production and chick rearing, bread and sewing, pig and babybeef, corn, potatoes and alfalfa. The enrollments show a wide spread interest, and the results show determined efforts and substantial profits.

We are also in our third year in Vermont. The enrollment this year is about 3,800, representing ten projects—gardening, canning, poultry, bread, sewing, pigs, corn, potatoes, livestock and handicrafts. Many of these boys and girls enrolled are listed in the 152 organized clubs in some 100 towns distributed within the fourteen counties of the state. A good proportion of these clubs have adult local leaders. All clubs have the usual officers necessary for an organized group elected from the membership.

Club Work brings to the attention of boys and girls while they are yet boys and girls the great possibilities in

their home surroundings. And, as one of the boys has himself well said, "It sets them a-going". It introduces into their practices the best known methods, and through demonstrations interprets the most efficient application of these methods. It supplies seasonable instructions to members, and follows up the use of the same. It requires records and reports upon work done. It suggests programs for meetings, and helps arrange festivals and exhibits and awards. It collects data, makes summaries, notes achievement, and names State Champions.

Whenever a community expresses an interest in boys' and girls' club work the State Clubs Leader investigates local conditions; and, with those expressing local interest, determines the club activities best suited to the community. Then members are enrolled, the club organized, and local leaders chosen who are to direct and supervise activities in the local field. The program is now made up, and an understanding entered into by the new club and the Extension Service. This understanding specifies what the local club will do and what the Vermont Extension Service will do.

In some communities existing organizations co-operate with us to the more efficient service of the Extension Service itself and of the local club. Such agencies are the public school, the Grange, parent-teachers, woman's club, board of trade, farm bureau, and Y. M. C. A. Many others there are of similar purpose readily suggesting themselves, which could give needed and concrete aid in this rapidly developing and worthy work. The chief and essential points wherein such agencies may help are sympathy and encouragement, local leadership, follow-up work, joint exhibits, and funds for prizes.

The United States Department of Agriculture has furnished us with thousands of bulletins and crop reports for the seasonal follow-up instructions. These have been supplemented by other thousands issued from our own office. Field agents from the Department Bureau from time to time give their personal assistance. The several County Agents help in their respective counties. Specialists in the Vermont State College of Agriculture are always available, ready to contribute their expert knowledge and constructive criticism.

In their achievements, club members rival their elders and oftentimes surpass them in respect to both quantity and quality of output, whether in garden or field, with poultry or livestock, in workshop or in kitchen. Their records and accounts show low cost of production and high percent of profit.

The meetings, festivals and exhibits required of the clubs develop the social interests and business capacities of our boys and girls, bringing them, as it does, into the closer relationships of co-operation and competition among themselves and with adult life. The club member's knowledge is increased, his horizon widened, his interests multiplied, his wits sharpened, his purposes shaped. Opportunities in life are shown and activities are directed. The most approved methods are taught, and the best known practices are demonstrated. Habits of industry and thrift are inculcated, natural gifts are discovered and trained—right habits of life are fixed.

The hope and expectation of all club work is that its ideals and teachings and practices of today will pervade the home life and home interests of the near future to the end that the next generation will be a generation of better home builders and better home keepers.

(Here were shown 75 slides illustrative of clubs activities and interests and results in the United States and in Vermont.)

As yet Vermont club work has done very little with fruit. It has touched small fruits as a part of the garden and canning project. But apples, the great Vermont Fruit, and Vermont Apples, the great fruit of the East, is untouched by our club boys and girls. The apple offers a wonderful field for development, and certain phases of the work should appeal particularly to our young people. The principles and practices in vogue with the other projects are equally adaptable in Horticulture. The New England Fruit Show glorifies the Vermont Apple, and not only points the opportunities open to those now in the lead, but shows the possibilities in reach of those who are soon to take our places. The Vermont Horticultural Society should emphasize in the minds of the boys and girls the great possibilities in our state for apple club work.

THE BEAUTIES AND MARVELS OF WINTER.

GEORGE W. PERRY, CHESTER.

In the early days of New England the winter was the playtime of the year. The summer vacation had not been invented then. During the spring, summer and autumn men, women and children labored incessantly from daylight till dark, except on Sunday; and no one dared, of course, to play on the Sabbath Day. But when the winter

drew on then the frolic of life began. The winter sports were ushered in by the husking parties, where the red ears made the hearts of the boys glad and the cheeks of the girls red. These were followed by apple bees, singing schools, spelling schools and quilting parties. " 'Twas from Aunt Dinah's quilting party I was seeing Nellie home". They did not sing it in those days, but they did it, which was much nicer. Most delightful of all were the sleigh rides, when young and old gathered at some noted country hostelry for a dance and supper. Dancing was not only more artistic and elaborate in those times, but it was far jollier when "Hull's Victory" and "Money Musk" and "The Virginia Reel" held the floor. Oh the driving home along the silver-mantled roads by moonlight! The young man had his best girl by his side, for every young man had a best girl in those days, and he did not need to keep both hands on the steering wheel either, for he could drive the colt with one hand, leaving the other arm free to embrace a most delightful "opportunity".

For the children the snow was a most charming play-fellow. There were no associations of toil connected with it. How they loved to wade in the deepest drifts, and to roll and tumble and wallow in its fleecy folds. What adepts they were in making and throwing snow balls, which were hard or soft, swift or slow, according to whether they were messengers of friendship or missiles of war. What skill they displayed in making snow forts and snow houses and snow men.

Nowadays, made tender and sensitive by living in hot houses, we dread the winter and hate the snow. We are almost ready to wish that we might hibernate like the bears and woodchucks, retiring to our dens at the beginning of cold weather, with nothing to enjoy but the anticipation of springtime.

But there is a promise of a return of the winter sports to favor. With the young men once more staying on the farms, with the fashion once more in vogue of sleeping in cold rooms and the love of the outdoor life, may come in an appreciation of the old time winter sports. Already some of our hotels have a winter season, which is sure to be popular if properly and wisely conducted. Tired of the noise and turmoil of the streets, which now never ceases night or day, worn out with balls and parties and receptions, the city people will come out in midwinter into the country to get rested and rejuvenated by the fresh air and bright sunshine, and to be wonderfully refreshed by the winter sports. They will come out to skate, to coast, to skee, to

snowshoe and toboggan; to ride to the music of jingling bells behind our Morgan horses. The automobile, with its dust and smell, isn't to be compared with it. They will rejoice to see the whole land dressed in white, like a happy bride; to see the sunlight strike across hill and valley, the dazzling whiteness made all the more brilliant in contrast with the rows and clumps of evergreens; to watch the full moon rise over a fairy land, glittering as though set with jewels, or another night to admire great Orion, as he leads his sparkling hosts across the blue fields of the sky; and, finest of all, to see our mountain peaks, in the glow of the setting sun, blush like a maiden's cheek, "a light such as never was", anywhere else, "on land or sea."

After spending several winters in Florida, two years ago, after the first big snowstorm, I began to realize that I had never appreciated the beauty of the snow or the charm of the winter landscape. So I determined to make this lecture, combining the beauty of many winter scenes with the marvels of the snow crystals, and I am happy to present to this great audience these attractions of winter.

The lecturer then threw on the screen a large number of beautiful winter landscapes, most of them from Vermont, and nearly all of them taken by himself. The last part of the lecture was devoted to the marvelous photo-micrographs of snow crystals made by Wilson A. Bentley of Jericho, Vt. Although only a Vermont farmer, he has surpassed all the world in the photographing of these delicate and wonderful creations. An audience of more than 1,200 people listened with very great attention and watched the pictures with great admiration.

EXTENSION WORK IN HORTICULTURE.

**J. CORYELL, ASSISTANT STATE LEADER EXTENSION SERVICE,
BURLINGTON, VT.**

The Vermont Agricultural Extension Service disseminates information in horticulture mainly in two different ways. The first is supplying farmers with printed matter in the form of bulletins, brieflets, etc. the idea being to give him practical information regarding pruning, spraying and cultural methods of the various fruits which he may put into practice on his farm. During the year many persons ask the Extension Service for definite information relating to some phase of the fruit industry. These inquiries are turned over to the Horticultural Department for reply,

Professor Cummings or his assistant furnishing the desired information. Thus the seeker after information is given the opinion and advice of a specialist who is devoting his entire time to horticultural work.

The second and most important method of disseminating information is through field work where the instructor comes in direct contact with the farmer who is seeking the information. In a community when the call is sufficiently important and enough farmers are interested, a member of the Horticultural Department goes out as a representative of the Extension Service to give personally the service the community desires. This may be in the form of a talk or a demonstration of the proper methods of pruning, spraying or grading fruit.

The county agricultural agents are a part of the Vermont Agricultural Extension Service and they are the men who are taking to the farms, information of known practical value and demonstrating it in such a way that the farmer does not question the advisability of following up-to-date methods in caring for his apple orchard.

With the very beginning of county agent work in Vermont it is apparent that the agents saw opportunities to be of service to the farmers along horticultural lines. In 1913 in the counties of Bennington, Caledonia, Windham and Windsor 20 orchards were cared for in whole or in part according to the recommendations of the agents and served as demonstrations in their respective communities. In 1914 the number of orchards so cared for was 77; and in 1915 it was 93. In 1916 the number reached 110. The agents have devoted most of the time given to horticulture to the renovation of old orchards.

The problem of keeping our old orchards in condition for maximum production is upon us today, and we are reminded of it every time we ride through Vermont and see on every hand neglected or only partially cared for orchards. According to census figures, the production of all orchard fruits increased by 25.3% in quantity between 1899 and 1909. The value of orchard fruits increased from \$450,000 in 1899 to \$801,000 in 1909. This is a very pleasing increase but it is believed that the farmer's income might have been more than doubled if he had devoted to this work half the amount of energy he gave to dairying. Everybody knows that the dairy industry is the backbone of our agriculture and should remain so; however, the incomes of many of our farmers might be substantially increased by taking advantage of the apple orchards already in existence.

In the main our extension problem is to reach the average farmer who has a small orchard rather than the large commercial orchardist. However, the Extension Service is equally willing to serve the latter as the occasion arises.

In the average farm orchard trees are found too close together and this has sent the bearing wood heavenward, making it difficult to spray and pick the fruit. Usually the branches are so thick that sunlight has been kept out, preventing the high color in fruit which is so much desired. In many instances there are too many varieties, a number of which are entirely undesirable. Loss from insect pests and injury from disease have been increasing under these conditions and the farmer finds it necessary to undertake a radical policy of orchard improvement, or be satisfied with a very inferior grade of fruit.

This condition of affairs leads to the belief that our Extension campaign should be planned to reach the average farmer and that he should be shown on his own farm or in his own community the advantages of pruning, spraying, fertilizing, grading and general orchard management.

The following taken from the report of a pruning demonstration conducted by one of our Vermont county agents last year.

"The orchards are located next to the road so the results of the work will show up plainly. Two of the orchards were in almost the worst possible state of neglect. The people seem to like demonstrations. While I was painting a wound on an old tree I overheard a man say 'I like to see a man do what he says ought to be done'".

In another report we find the following:

"At this farm the clearing out and grafting of an abandoned nursery was begun. The trees were allowed to grow up in the nursery row. These were thinned out to about thirty feet and the remaining trees were grafted. Only a small beginning was made but the owner planned to go on with the work next winter. Some of the orchard men seem likely to be orchard demonstrators for the rest of their lives. Four spray outfits have been purchased. Two of the orchards at least are the first ones ever sprayed in the towns. One man said: 'The more of this orchard work I do the better I like it.'"

In describing another demonstration meeting the same agent says:

"The attendance at the demonstration meetings was small but those who came showed good interest. One man drove four miles through mud and rain to the demonstra-

tion. I put on an old coat and demonstrated grafting and pruning in the rain."

This is real Extension Work in Horticulture and a kind that will make itself felt in the agriculture of the state and in the pocket books of the farmers.

In 1915 seven county agents were conducting orchard management demonstrations and have records showing that 93 orchards were cared for in whole or in part according to suggestions of the agents in these seven counties. Field meetings were held at many of these orchards and the total shows that 330 farmers were in attendance.

This Extension work in Orchard Management was considered so important that a definite project was agreed upon by the Extension Service and the various farm bureaus at a State County Agent Conference held at Burlington in January, 1916. This agreement takes up a plan of Extension Work to be carried on in the various counties through the co-operation of the Vermont Extension Service and the Farm Bureaus, and reads as follows:

Project No.....

NAME OF PROJECT.—Apple Orchard Management.

LEADER.—.....County Agent.

HEADQUARTERS.—.....

DATE AUTHORIZED.—.....

LEGAL AUTHORITY.—Smith-Lever Act, Federal Law, No. 1 Vermont Acts No. 23, 1915, No. 120, 1915, No. 121, Section 2, 1912.

OBJECT.—To increase the profits from apple orchards.

METHOD OF PROCEDURE.—Through letters, meetings and personal conference.....farmers will be secured in.....county who desire to conduct orchard management demonstrations in co-operation with the agricultural agent.

1. Pruning and spraying.
2. Tillage, fertilizing and cover crops.
3. Grading and packing.

(1.) (a) The trees shall be moderately pruned tending toward an open top. All wounds shall be disinfected with mercuric chloride:—1 blue mercuric chloride tablet to 1 pint of water. Wounds shall be painted with white lead and linseed oil when necessary.

A dormant spray—lime sulphur 1-9 shall be applied when the buds are half open. A spray for codling moth, etc., shall be applied when petals fall. Three pounds arsenate of lead-lime sulphur, 1-40. Other sprays to fit conditions.

In orchards where railroad worms are troublesome the trees will be sprayed about July 1st and August 1st, with a poisoned bait made up as follows:—2½ lbs. arsenate of lead, 12½ lbs. molasses or syrup with 50 gallons of water.

2. Suitable methods of tillage and of cover cropping fertilization shall be adopted where conditions make it necessary.

3. A grading and packing demonstration shall be held at all demonstration orchards.

Six trees or more shall be left as checks so that farmers may have a means of measuring the results obtained from methods and practices demonstrated.

RECORDS.—Records of the results of each demonstration shall be kept by the county agent and put on file in his office. Farmers shall be furnished with duplicate records where they so desire and shall at all times during the continuation of the project, keep such records of results as shall enable the county agent to prepare a summary:

PUBLICITY.—(1.) At least two field meetings shall be held at demonstration plots, one to demonstrate methods of pruning and one to demonstrate results of spraying and methods of grading and packing. A meeting at the time of the codling moth spray is recommended.

(2) Each demonstration shall be in so far as possible located along a well traveled road.

(3.) A suitable poster shall be used to call the attention of the public to the work.

(4.) Photographs are to be secured when they may serve to distribute knowledge concerning results.

(5.) Whenever possible, material shall be prepared from successful demonstrations to be used in exhibits at the county fairs and the Vermont State Fair.

CO-OPERATION.—Local committeemen and advisory councilmen are expected to render all possible assistance such as arranging for meetings, disseminating information, etc. It is understood that the Vermont Extension Service is to give such assistance and supervision as seems necessary to secure the best results with the project.

..... (Approved)

Date. President. County.

..... (Approved)

Date. State Leader.

..... (Approved)

Date. County Agent.

Putting the work on this basis has resulted in greater efficiency. More has been done and a larger number of farm-

ers has been reached. In 1916 nine agents were carrying orchard projects and work has been done in 110 orchards. Sixty-one meetings have been held in these orchards which 492 farmers attended.

The following taken from one of Mr. Otis's recent reports shows a sample of the results obtained in this country:

"At the orchard demonstration meeting Thursday the apples from both a sprayed and an unsprayed tree were picked. The apples from each tree were graded into two piles; the culls in one pile and the apples practically free from insect or fungus injury in another. The unsprayed tree yielded 557 apples, 117 of which were free from fungus and insect injury while 440 were culls. The sprayed tree yielded 544 apples, 434 of which were free from injury and 110 of which were culls.

In Franklin county six orchard management demonstrations were conducted this year. Splendid results were obtained and the value of this work to the practical farmer was demonstrated. It is significant that at a recent show in St. Albans where between five hundred and six hundred plate entries of apples and nine collections were in competition that first and second prizes on collections and the majority of ribbons on single plate entries were carried away by two farmers who had improved their orchards this year under County Agent Tiffany's instructions.

In Orleans county the County Farmers' Association arranged for the services of a man who went into various towns pruning and spraying the trees of farmers who so desired. This plan has not worked with complete satisfaction on account of the large demand for the services of the man, and the limited time in which the spraying must be done. Mr. Deuel says that the work may be continued to some extent another year but he believes it would be more satisfactory if each community would arrange for some one to look after this work.

Much the same arrangement was made in Rutland county last spring and was entirely successful in so far as the farmers could be accommodated. Several orchards were pruned and sprayed but the work was limited to what one or two men could do.

From these two trials of orchard improvement several important facts have been determined:

1. That the farmers are interested and wish to improve their orchards.
2. That the average farmer with the small orchard would rather pay the other fellow for doing the work than equip for it himself.

With these facts in mind it would seem that the Extension Service could be of much value to the farmers of the state by encouraging them to work in community groups, such as Granges or Farmers' Clubs, in making arrangements for some person to look after the pruning and spraying needs of the community. The number of farmers accommodated, due to the character of the project, of necessity must be small. However, in many sections the man who has the time and inclination to do this work, furnishing all the apparatus and spray materials can be found so that the average farmer does not have to bother with the details.

Vermont hillsides can produce apples second to none in quality and color. It remains for the farmers of the state to make the most of their opportunities. The western grower has used more business-like methods and is selling apples at our very door. I ask you as New England Fruit producers, are you going to let this state of affairs continue, or are you going to take the trouble to give the consumer the kind of fruit he wants, put up in the shape that he so much desires, and receive the added income for your labor?

The Vermont Agricultural Extension Service wants to be of all possible assistance to you in helping to make this Green Mountain State one of the leading horticultural sections of New England. In co-operation there is strength and we believe our farmers are practicing that co-operation more and more each year.

SOME PRINCIPLES OF SEED SELECTION.

W. C. STONE, EXPERIMENT STATION, BURLINGTON, VT.

In recent years land values have increased very rapidly. Farming lands or agricultural lands, in general, have advanced far beyond their original cost and during these periods of advancement in many instances they have been depleted in their resourceful supply of plant food. This condition necessitates the importance of good crops, in order to meet the demands of a good investment, to return to the owner sufficient interest on the money invested and pay him well for his labor. On account of these new conditions it is very essential that our domesticated plants be greatly improved or, at least kept up to their greatest producing ability. Even wild plants should be introduced and improved if they are of value and adapted to conditions which the present cultivated species and varieties are not fitted. Our markets demand good and excellent quality. It is

important to increase our crop yields and by doing so, we must not lose quality. Also it is evident that as new plants and varieties are introduced new pests and diseases seem to become evident. Consequently we must produce plants which are free from many diseases and not susceptible but resistant to them. It is apparent that the breeder of plants, the one who improves plants, has a wonderful field, but a very complicated and difficult one. His tasks seem endless. Thus far, in these few years of methodical breeding very encouraging results have been accomplished. Certain principles have been discovered and applied.

One great difficulty in the producing of seed is to keep it pure. Seedsmen must give their greatest attention and skillful supervision in this matter. Often gardeners buy their seed of what they consider reliable firms and find to their dismay at harvest time all sorts of varieties mixed with those they desired. Here exists a need which a breeder must exercise. He must guard against any introduction of foreign pollen which will give a mixed heritage. He must sort out, or rogue his seed plants with the utmost care, and then test out his improved strains to prove their trueness to type.

Even with a "golden age" of sufficient sunshine, of plentiful rain, evenly distributed throughout the season, and an excellent seed bed and thorough tillage, poor seed would give small returns. Picture if you can, under these ideal conditions, the bountiful results of sowing the best seed. Instead of a Golden Age, during thousands of the years since man began to select his grain, he has experienced all kinds of obstacles. At last man has found that plants vary and he can make them vary, the very basis of all selection. So has the plant breeder become useful to the farmer, the gardener and fancier.

It has been noted in several instances, and investigations at the Vermont Experiment Station have shown that the larger seeds produce the most vigorous and healthy plants. Many times yields are influenced by selecting the largest seeds, for they produce the high yielding plants.

Briefly, let us discuss one phase of plant breeding which we may call seed selection. We have already noted that the foundation or basis of seed selection is variation. Such a statement is readily understood. If there were no variation there certainly could not be any selection. Let us suppose, all apples are exactly alike, not one single character among these thousands of apples about us differed in any particular, would there be any New England Fruit Show, or any premiums offered to growers of Vermont

apples. How simple and how apparent this is. But variation leads to many complications and the behavior of fruit characters presents many riddles which have thus far been entirely unsolved. What progress has been made in a methodical way is of very recent date.

In relating some principles of seed selection, it is difficult not to become too technical for the uninformed and to become enough technical for the research man or breeder; I believe it is better to favor the former. It is highly important that the person know the plant with which he works before he begins his selection. He must become exceptionally familiar with the behaviour of the characters of the plant and know its adaptations and variations. He must study its physical and anatomical properties. With an extensive knowledge of the plant, he must form an ideal, or a type which he desires to reach. In selection within a race the breeder should have all the characters of the race which he is breeding clearly in mind, in order to adhere, strictly to the type of the variety in the selections.

Variations exist among all apples. Most of us have an opinion as to which is the best variety, and perhaps the best apple in that variety, yet, we can form an ideal in our minds which may never be equaled. For instance, we may wish for an apple that will keep as well as the Ben Davis, taste as well as the Northern Spy or McIntosh, and look as beautiful as the Baxter.

Since all plants vary, they may be made to do so by change of environment or by a great supply of plant food. Environment relates to the conditions about or surrounding the plant, such as soil conditions, temperature, light and moisture. These variations are seldom transmitted to the progeny of the parent unless by constant action of the environment which may influence the germ plasm or the hereditary stimulus of the plant. Unfavorable conditions of the season for the growth of a crop may be favorable for finding the best plant for breeding purposes. The fact is that really valuable varieties have been developed and come into general use gradually, and only after years of patient work.

Closely allied with variation, and in reality one form of variation, are mutations. Sometimes an expression is used in the place of "variability of plants" which is "mutability of plants". A mutant is a sudden reorganization or reconstruction of the characters of a plant which may produce a new species. Mutants are capable of precise reproduction.

It is essential that the practical man finds the plant best adapted to the environment in which he lives, to the soil he tills and to the market which he supplies, or to the purpose for which he uses the crop. He must make many selections, so that he may study many individuals, discarding those most distant from his ideal type. The keynote of improvement is the selection of the best. This requires the growing of large numbers, under uniform conditions. Next he must test the transmitting ability of the plants for the character or characters in question. He must note the progress or regression in the progeny and try to induce the plant to vary about his desired type. The purpose of selection is to reduce numbers so as to influence the type or shift the type the way that one may wish. This changing of the type does not reduce the variability. There are limits in mechanical principles and physiological restrictions. Difficulties increase rapidly in selection with a number of points on which selection is to be based.

Selection in a pure line has some value. Pure line breeding is breeding without the introduction of foreign parentage in a race. Variations occur in a pure line but the progeny varies about the same mean or type. Selection here, may be only to discard the diseased and poor specimens.

In plant breeding it is desirable that the seed of the select individuals be planted in a field by themselves. This insures that only progeny of carefully selected plants will be planted near together and thus no ordinary stock will enter in as a contamination. One can be certain that each plant of the progeny is fertilized with the pollen from another similarly good plant or at least a plant derived from good parentage. If the case is of one of plants which are usually cross-fertilized, in continued selections in isolated plots, there may be a loss of vigor and vitality. In plants, however, it is possible to secure much closer in-breeding than in cases of animals, as many plants can be successfully fertilized with their own pollen.

Mass selection is the oldest form of selection. This has been somewhat successfully practiced by some breeders. Mass selection is the sorting out of the best individuals in a field using the seed collectively. Later breeders have practiced pedigree selection or culture, which is the keeping of records of certain individuals and their progeny. This method has been more progressive, and is productive of great results. The individual is an important factor in plant breeding. The progeny for several generations of the selected individual must be studied and careful obser-

vations and notes recorded from year to year to learn the real nature and behaviour of the characters. For example, it is very important to know that a certain plant which produces a heavy yield has the faculty of transmitting this tendency to its progeny. Two plants which have been selected, having the same yield, may give progeny which are greatly different in that respect. One plant has a great degree of inheritance while the other has very little.

In cases where selection is made by cutting, tubers etc., there is no danger of introducing foreign parentage. Selections may be continued in the field with the remainder of the crop. In potato selection the tuber may be the unit. It has been found that the yield may be kept up to the average of the crop, and all diseased and inferior potatoes greatly diminished. Mutations may appear at any time. Their propagation is very desirable.

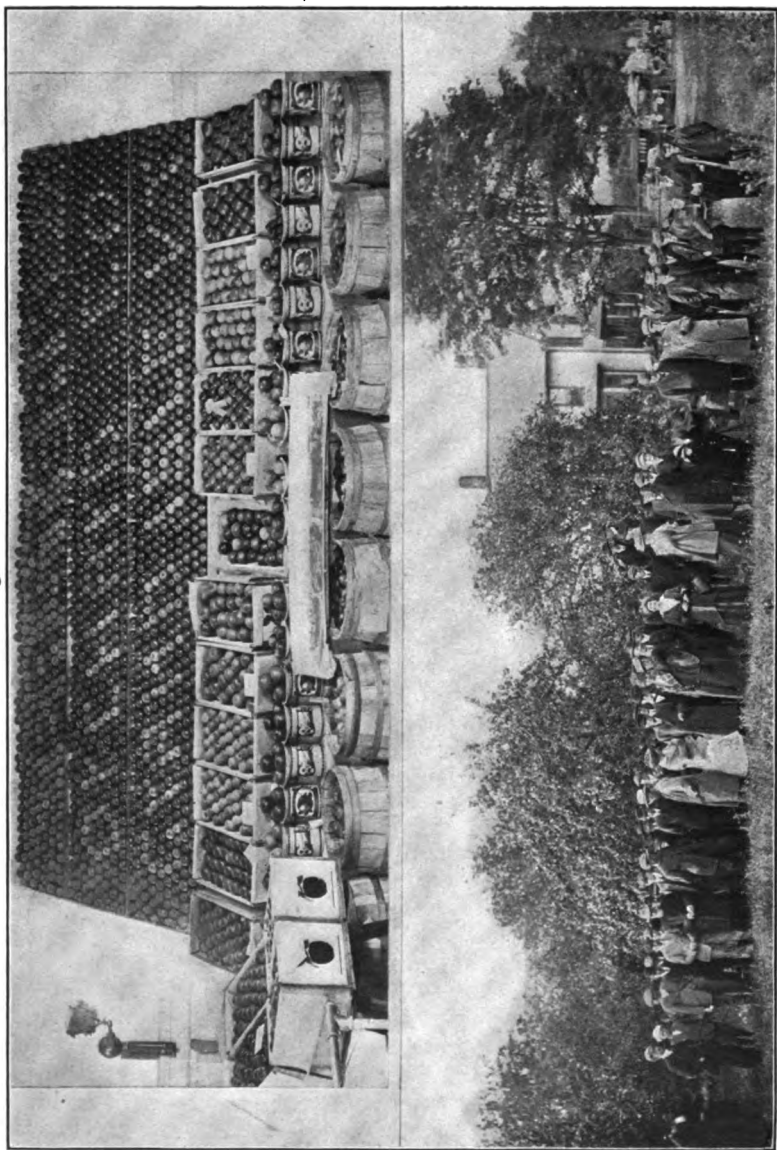
Experience of breeders has left no doubt as to the fact that the only true starting point for the fixation of different types must be plants which are taken one by one. Therefore, we find various methods, like the following; sowing the seed of one plant to a row, one head of grain or grass to the row; an ear to a row; or the cuttings of one tuber to four hills.

REFORMS IN APPLE MARKETING IN VERMONT.

HON. E. S. BRIGHAM, ST. ALBANS.

"It is a well known fact that Vermont has great potential possibilities as an apple growing state. The lands and the climate of our Champlain Valley have been pronounced by one of the leading experts of the country as being ideally suited to the production of apples. Here and there in other parts of the state good growers have demonstrated that our apple lands are not confined to the Champlain Valley alone but include a good portion of our territory.

"The results obtained by our best producers demonstrate the possibilities of securing an average crop of satisfactory size. The prices received by some growers, seems to demonstrate the popularity of good Vermont apples in the market. In fact it is generally conceded that an apple grown in Vermont in a well-cared-for apple orchard possesses a flavor and a juiciness which its Western competitor cannot equal.



ABOVE, DISPLAY AT NEW ENGLAND FRUIT SHOW. BELOW, AT THE SUMMER MEETING.

"Taking into consideration these opportunities and these demonstrated possibilities does it not seem strange that apple growing is not more of a business in Vermont? The census of 1910 showed an average of but 36 apple trees per farm. Even the large profits made by a few growers in recent years and the wide advertising which they have received have failed to awaken much interest in apple culture. Some large orchards have been planted but it is doubtful if these plantings greatly exceed the mortality of the trees in our older orchards which are falling into decay.

"What is the trouble? Why are apple lands within 300 miles of the market selling for \$100.00 per acre, while apple lands on the Pacific coast, 3,000 miles distant sell for more than 10 times this amount? Why do the fruit stores in our larger Vermont towns sell Western fruit through a greater portion of the apple season and why do our Vermont consumers purchase boxes of Pacific coast apples for their home supplies? These are pertinent questions for the consideration of those who are interested in the development of Vermont.

"Casting about for an answer, I half suspect that a portion of the trouble lies in the fact that the world has made progress and Vermont apple growers generally have not kept pace with it. Transportation has been so developed in this country within a period of 40 years that the product of any one portion of our great country may be transported at a reasonable cost to a market in any other portion. "Our Eastern growers follow practically the old methods of individual packing and sale. A few men have learned how to grade and pack fruit in a first class manner. It has been reported to me by a New York City banker who is interested in a Vermont apple orchard, that dealers in New York tell him "that the very best box of apples sent to New York City is sent by C. L. Witherell of Middlebury". What we need in Vermont is 1,000 apple growers like Mr. Witherell. And there are several others. Then we could revolutionize the agricultural industry and change the history of the State."

"The House Committee reported the grading bill favorably with several proposals of amendment which did not greatly affect the intents and purposes of the bill. The House Journal shows that Mr. Hapgood of Peru moved that the bill be further amended by adding the following section: "This act does not prevent any person from shipping apples in the old fashioned or any other way in case he so desires.

"This amendment was agreed to by the House but was rejected by the Senate. A compromise however, was effected by substituting in lieu of the jocular wording of this amendment other words which meant practically the same. The Attorney-General ruled that the Act as passed applies only to close packages of apples which are branded as packed in accordance with its terms. Therefore, a man may still use any inscription he pleases on his packages of apples if he does not state in this inscription that the contents are packed and graded according to provisions of Act 169 of the Act of 1915. Stating the matter plainly the apple grading law in its present form is of use only to occupy so many pages of the public statutes. Should the law be amended so that, like the State of Massachusetts, we shall require all apples to be packed and branded in accordance with its terms?" I think so.

REPORT OF SECRETARY.

M. B. CUMMINGS.

The best report I can give this year is to say that the great New England Fruit Show has been held in Vermont for the first time. We have needed for many years the encouragement and inspiration which this event brings. To most Vermonters the New England Fruit Show has meant but little, for only a few have seen a great exhibition of this kind. Every state in New England has entertained the show, and all have profited thereby. We take our turn this year.

It has been no small task to bring this great event to pass. It would have been impossible without the help of many people. I would mention in particular the Montpelier Board of Trade, our state vice president, Geo. D. Aiken of Putney, and many men who gave money directly or who gave in advertisements in the premium list, to make out the budget for this exhibition and meeting. We are also indebted to the various papers in the state, and the rural press outside of Vermont, for the generous space allowed, to acquaint the public with this extensive enterprise. Our society and the work that it is trying to carry out has received more general publicity this year than in any other period in its history.

This great show and the excellent addresses that go with it, are not ends in themselves. They should serve rather as a means of encouragement and inspiration. We are just grasping the fact that the needs and opportunities

are indeed very great here in Vermont. We realize now what can be done, we hope to do it. It is the function of this society to develop an appreciation of the horticultural outlook in Vermont, and to point the way toward improvement. We are doing these things as fast as time and means permit.

The society is doing its work well; it is fulfilling its mission. May the people profit much from our endeavors.

REPORT OF TREASURER.

W. C. COLTON.

RECEIPTS.

November 6, 1915 to November 10, 1916.

1915.			
Nov.	6	Cash on hand	\$ 411.49
	27	Cash from secretary, dues	64.00
1916.			
Jan.	1	Interest on deposits	2.38
	4	State appropriation	500.00
Mar.	2	Cash from secretary, dues	23.00
July	1	Interest on deposits	9.50
Sept.	30	Cash from secretary, dues	10.00
Oct.	21	Cash from secretary, dues	1.00
Nov.	9	Cash from secretary, dues	18.00
Total			\$1,039.37

EXPENDITURES.

November 6, 1915 to November 10, 1916.

PREMIUMS.

		Voucher No.	
1915.			
Dec.	1	Edward Everett, Bennington	656 \$ 10.50
	1	R. R. Allen, So. Hero	657 5.00
	1	Darrow and Aiken, Putney	658 9.50
	1	Luther Putnam, Cambridge	659 13.50
	1	Mrs. D. C. Noble, Middlebury	660 5.00
	1	Arthur Hill, Isle La Motte	661 4.00
	1	G. H. Terrill, Morrisville	662 14.50
	1	C. L. Witherell, Middlebury	663 2.00
	1	E. H. West, Dorset	664 10.00
	1	A. T. Clark, Vergennes	665 1.00
	1	E. H. Hallett, St. Johnsbury	666 1.00
			\$ 76.00

LECTURERS.

Dec.	1	William Bentley, Jericho	653	\$	7.00
	1	W. C. Stone, Burlington	667		2.15
	7	B. F. Lutman, Burlington	668		1.80
	7	E. H. West, Dorset	674		1.31
	7	C. L. Witherell, Middlebury	669		3.84
	7	George D. Aiken, Putney	670		10.87
	7	J. H. Gourley, Durham, N. H.	672		35.20
	7	F. A. Waugh, Amherst, Mass.	673		36.11
	29	G. W. Perry, Chester Depot	675		8.02
1916.					
Feb.	8	H. L. Bailey, Bradford	682		4.79
	29	E. H. Hallett, St. Johnsbury	681		2.34
Oct.	7	B. F. Lutman, Burlington	693		2.50
	7	W. C. Stone, Burlington	694		2.50
					<hr/>
					\$118.43

OFFICERS.

1915.					
Dec.	1	A. M. Vaughan, expenses as Pres....	655	\$	6.07
	7	M. B. Cummings, expenses as Secy...	651		14.30
	7	W. C. Colton, expenses as Treas.....	671		3.11
1916.					
Jan.	19	Vermont Business College, work for Sec.	679		2.50
Feb.	8	Miss E. Bingham, work for Sec.....	683		5.25
Mar.	15	M. B. Cummings, salary and postage..	684		115.00
May	3	M. B. Cummings, expense as Secy....	685		8.92
	3	W. C. Colton, postage as Treas.....	686		1.33
	3	Miss E. Bingham, work for Secy.....	687		3.40
July	1	M. B. Cummings, postage and ex- penses as Secy.	688		11.37
	1	Miss E. Bingham, work for Secy.....	689		.70
	1	Geo. D. Aiken, exp. V. P. N. E. Fruit Show	690		8.39
Sept.	8	J. L. Hills, Stenographer for Secy....	691		25.00
Oct.	7	M. B. Cummings, postage and ex- pense as Secy.	695		20.39
	7	E. H. West, expense as Pres.....	696		7.62
Nov.	6	M. B. Cummings, postage as Secy....	698		20.00
	6	Vermont Business College, work for Secy.	699		1.26
	6	W. C. Colton, postage as Treas.	700		1.00
	6	M. C. Bond, work for Secy.....	701		6.00
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					\$261.61

MISCELLANEOUS.

1915.		
Nov.	12 Whitehead & Hoag Co., ribbons, etc...	649 \$ 18.75
	12 Free Press Asso., printing	650 20.50
Dec.	1 Randall House, hotel bills of officers and lecturers	652 66.50
	1 L. P. Thayer, paper for tables.....	654 3.00
1916.		
Jan.	19 Free Press Asso., printing.....	676 7.50
	19 Miss S. A. Nott, reporting annual meeting	677 59.00
	19 W. C. Stone, photographer	678 2.50
	19 M. C. Lilley Co., repairs on badges...	680 5.00
Oct.	7 Free Press Asso., printing.....	692 9.75
	7 Capital City Press, premium lists...	697 136.50
Nov.	6 Free Press Association, printing....	702 27.30
		<hr/>
		\$356.30
Nov.	9 Cash on hand	\$227.03

SUMMARY.

Premiums	\$ 76.00
Lectures	118.43
Officers	261.61
Miscellaneous	356.30
Cash on hand Nov. 9, 1916.....	227.03
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Total	\$1,039.37

Respectfully submitted,

W. C. COLTON, *Treas.*

Audited and found correct Nov. 15, 1916.

A. T. CLARK, *Auditor.*

LIST OF AWARDS IN 1916.**Vermont Horticultural Society and New England Fruit Show.**

SWEEPSTAKES.		Prize.	Amt.
Barrel, Box,	E. N. Sawyer, Salisbury, N. H.,	Gold medal.	
	C. L. Witherell, Middlebury, Vt.,	Gold medal.	
BEST TEN BOXES.			
	C. L. Witherell, Middlebury, Vt.,	First,	\$40.00
	The Orchards, Bennington, Vt.,	Second,	20.00
	Eastern Fruit Co., Grand Isle, Vt.,	Third,	10.00
BEST FIVE BOXES.			
	C. L. Witherell, Middlebury, Vt.,	First,	\$25.00
	Julian A. Dimock, E. Corinth, Vt.,	Second,	15.00
	Arthur H. Hill, Isle LaMotte, Vt.,	Third,	10.00
SPECIAL TWO BOXES.			
	E. H. West, Dorset, Vt.,		\$10.00
SPECIAL DISPLAY.			
	The Orchards, Bennington, Vt.,	First,	\$9.00
	C. L. Witherell, Middlebury, Vt.,	Second,	9.00
	Wright A. Root, Easthampton, Mass.,	Third,	7.00
BARREL EXHIBITS.			
Baldwin,	E. L. Salisbury, Salisbury, N. H.,	First,	\$15.00
	A. L. Fish, Colerain, Mass.,	Second,	10.00
	The Orchards, Bennington, Vt.,	Third,	5.00
Greening,	E. N. Sawyer, Salisbury, N. H.,	First,	\$15.00
	E. H. West, Dorset, Vt.,	Second,	10.00
	T. K. Winsor, Greenville, R. I.,	Third,	5.00
Northern Spy,	A. C. S. Bartlett, Laconia, N. H.,	First,	15.00
	The Orchards, Bennington, Vt.,	Second,	10.00
	Washington Fruit Growers Asso., Wash., Conn.	Third,	5.00
King,	Arthur H. Hill, Isle LaMotte, Vt.,	First,	15.00
	E. Rogers, Southington, Conn.,	Second,	10.00
	W. C. Holcomb, Isle LaMotte, Vt.,	Third,	5.00
Russet,	Wash. Fruit Growers Asso.,	First,	15.00
BOX EXHIBIT.			
Baldwin,	C. L. Witherell, Middlebury, Vt.,	First,	\$12.00
	The Orchards, Bennington, Vt.,	Second,	8.00
	A. H. Hill, Isle LaMotte, Vt.,	Third,	4.00
Gravenstein, McIntosh,	T. K. Windsor, Greenville, R. I.,	First,	12.00
	E. N. Sawyer, Salisbury, N. H.,	First,	12.00
	Mrs. D. C. Noble, Middlebury, Vt.,	Second,	8.00
	E. H. West, Dorset, Vt.,	Third,	4.00

Northern Spy,	C. L. Witherell, Middlebury, Vt.,	First,	12.00
	The Orchards, Bennington, Vt.,	Second,	8.00
	E. H. West, Dorset, Vt.,	Third,	4.00
Wagener,	C. L. Witherell, Middlebury, Vt.,	First,	12.00
	Gulley & Bonner, Rockville, Ct.,	Second,	8.00
	The Orchards, Bennington, Vt.,	Third,	4.00
Grimes Golden, Spitzenburg,	The Orchards, Bennington, Vt.,	First,	12.00
	C. L. Witherell, Middlebury, Vt.,	First,	12.00
	The Orchards, Bennington, Vt.,	Second,	8.00
Wealthy,	A. H. Hill, Isle LaMotte, Vt.,	Third,	4.00
	Flintstone Farm, Dalton, Mass.,	First,	12.00
	C. C. Pettigrew, Mt. Vernon, N. H.,	Second,	8.00
	Luther Putnam, Cambridge, Vt.,	Third,	4.00

PLATE EXHIBITS.

Baldwin,	J. F. Moody, Hebron, Me.,	First,	\$5.00
	E. N. Sawyer, Salisbury, N. H.,	Second,	4.00
	Elmer B. Parker, Wilton, N. H.,	Third,	3.00
	Bearce Bros., Hebron, Me.,	Fourth,	2.00
	A. A. Conant, Hebron, Me.,	Fifth,	1.00
McIntosh,	A. T. Clark, Vergennes, Vt.,	First,	5.00
	D. R. Miller, Putney, Vt.,	Second,	4.00
	E. H. West, Dorset, Vt.,	Third,	3.00
	W. C. Holcomb, Isle LaMotte, Vt.,	Fourth,	2.00
	A. H. Hill, Isle LaMotte, Vt.,	Fifth,	1.00
Northern Spy,	R. L. Heminway, Middlebury, Vt.,	First,	5.00
	C. L. Witherell, Middlebury, Vt.,	Second,	4.00
	Mrs. D. C. Noble, Middlebury, Vt.,	Third,	3.00
	The Orchards, Bennington, Vt.,	Fourth,	2.00
	W. F. Ranney, Putney, Vt.,	Fifth,	1.00
R. I. Greening,	The Chase Orchards, Buckfield, Me.,	First,	5.00
	The Orchards, Bennington, Vt.,	Second,	4.00
	A. T. Clark, Vergennes, Vt.,	Third,	3.00
	Mrs. D. C. Noble, Middlebury, Vt.,	Fourth,	2.00
	John French, Burlington, Vt.,	Fifth,	1.00
Sutton,	E. N. Sawyer, Salisbury, N. H.,	First,	4.00
	W. F. Ranney, Westminster, Vt.,	Second,	3.00
	A. B. Howard & Son, Belchertown, Mass.,	Third,	2.00
Fall Pippin,	C. L. Witherell, Middlebury, Vt.,	First,	4.00
	A. B. Howard & Son, Belchertown, Mass.,	Second,	3.00
	D. R. Miller, Putney, Vt.,	Third,	2.00
	A. L. Fish, Colerain, Mass.,	Fourth,	1.00
Fameuse,	W. C. Holcomb, Isle LaMotte, Vt.,	First,	4.00
	A. H. Hill, Isle LaMotte, Vt.,	Second,	3.00
	D. R. Miller, Putney, Vt.,	Third,	2.00
	E. H. West, Dorset, Vt.,	Fourth,	1.00
Grimes Golden,	The Orchards, Bennington, Vt.,	First,	4.00
	Elmer Parker, Wilton, N. H.,	Second,	3.00
	A. L. Buck, Hebron, Me.,	Third,	2.00
Hubbardston,	D. R. Miller, Putney, Vt.,	First,	4.00
	The Orchards, Bennington, Vt.,	Second,	3.00
	W. F. Ranney, Putney, Vt.,	Third,	2.00
	J. F. Moody, Hebron, Me.,	Fourth,	1.00

King,	C. L. Witherell, Middlebury, Vt.,	First,	4.00
	Bearce Bros., Hebron, Me.,	Second,	3.00
	A. H. Hill, Isle La Motte, Vt.,	Third,	2.00
	A. T. Clark, Vergennes, Vt.,	Fourth,	1.00
Maiden's Blush,	D. R. Miller, Putney, Vt.,	First,	4.00
	W. G. Conant, Hebron, Me.,	Second,	3.00
	A. A. Conant, Hebron, Me.,	Third,	2.00
	The Orchards, Bennington, Vt.,	Fourth,	1.00
Red Canada,	A. A. Conant, Hebron, Me.,	First,	4.00
	A. H. Hill, Isle La Motte, Vt.,	Second,	3.00
	A. F. Clark, Vergennes, Vt.,	Third,	2.00
	Wash. Fruit Growers Ass.,	Fourth,	1.00
Belleflower,	A. H. Hill, Isle La Motte, Vt.,	First,	4.00
	W. F. Ranney, Putney, Vt.,	Second,	3.00
	Eastern Fruit Co., Grand Isle Vt.,	Third,	2.00
	C. L. Witherell, Middlebury, Vt.,	Fourth,	1.00
Wagener,	W. G. Conant, Hebron, Me.,	First,	4.00
	C. L. Witherell, Middlebury, Vt.,	Second,	3.00
	The Orchards, Bennington, Vt.,	Third,	2.00
	A. A. Conant, Hebron, Me.,	Fourth,	1.00
Wealthy,	Conn. Valley Orchard Co.,		
	Westminster, Vt.,	First,	4.00
	A. L. Fish, Colerain, Mass.,	Second,	3.00
	C. L. Witherell, Middlebury, Vt.,	Third,	2.00
Rox Russet,	The Orchards, Bennington, Vt.,	Fourth,	1.00
	A. A. Conant, Hebron, Me.,	First,	4.00
	E. E. Hutchinson, Hebron, Me.,	Second,	3.00
	C. W. Cummings, Hebron, Me.,	Third,	2.00
Sutton,	A. L. Fish, Colerain, Mass.,	Fourth,	1.00
	E. N. Sawyer, Salisbury, N. H.,	First,	4.00
	W. F. Ranney, Putney, Vt.,	Second,	3.00
	A. B. Howard & Son, Belchertown,		
Yellow Transparent,	Mass.,	Third,	2.00
	E. H. West, Dorset, Vt.,	First,	4.00
	A. L. Fish, Colerain, Mass.,	First,	4.00
	H. G. Bowman, Hebron, Me.,	First,	4.00
Gravenstein,	E. N. Sawyer, Salisbury, N. H.,	Second,	3.00
	Elmer B. Parker, Wilton, N. H.,	Third,	2.00
	Bearce Bros., Hebron, Me.,	Fourth,	1.00
	Chase Brothers, Buckfield, Me.,	First,	3.00
Tolman Sweet,	W. G. Conant, Hebron, Me.,	Second,	2.00
	The Orchards, Bennington, Vt.,		1.00
	T. K. Winsor, Greenville, R. I.,	First,	3.00
	A. A. Conant, Hebron, Me.,	Second,	2.00
Gilliflower,	Wright A. Root, Easthampton,		
	Mass.,	Third,	1.00
	W. F. Ranney, Putney, Vt.,	First,	3.00
	L. Putnam, Cambridge, Vt.,	Second,	2.00
Johnathan,	The Orchards, Bennington, Vt.,	First,	3.00
	A. F. Clark, Vergennes, Vt.,	Second,	2.00
	Eastern Fruit & Nut Co., Grand		
	Isle, Vt.,	Third,	1.00
Nodhead,	O. L. Buck, Hebron, Me.,	First,	3.00
	C. W. Cummings, Hebron, Me.,	Second,	2.00
	J. F. Moody, Hebron, Me.,	Third,	1.00
	Elmer B. Parker, Wilton, N. H.,	Second,	2.00
Opalescent,	W. G. Conant, Hebron, Me.,	First,	3.00
	D. R. Miller, Putney, Vt.,	Second,	2.00
	The Orchards, Bennington, Vt.,	Third,	1.00

Blue Pearmain,	W. F. Ranney, Putney, Vt.,	First,	3.00
	Elmer B. Parker, Wilton, N. H.,	Second,	2.00
	E. E. Lyman, White River Jct., Vt.,	Third,	1.00
Golden Russet,	E. R. Farrar, So. Lincoln, Mass.,	First,	3.00
	C. L. Witherell, Middlebury, Vt.,	Second,	2.00
	J. F. Moody, Hebron, Me.,	Third,	1.00
Lady, Oldenburg,	W. H. Atkins, So. Amherst, Mass.,	Second,	3.00
	A. L. Fish, Colerain, Mass.,	First,	3.00
	A. B. Howard & Son, Berchertown, Mass.,	Third,	1.00
Palmer Greening,	W. C. Holcomb, Isle LaMotte, Vt.,	First,	3.00
	A. H. Hill, Isle LaMotte, Vt.,	Second,	2.00
Pecks Pleasant,	C. L. Witherell, Middlebury, Vt.,	First,	3.00
	A. B. Howard & Son, Belchertown, Mass.,	Second,	2.00
Pound Sweet,	C. L. Witherell, Middlebury, Vt.,	First,	3.00
	D. R. Miller, Putney, Vt.,	Second,	2.00
	E. N. Sawyer, Salisbury, N. H.,	Third,	1.00
Alexander, Ben Davis,	L. Putnam, Cambridge, Vt.,	Second,	2.00
	T. K. Winsor, Greenville, R. I.,	First,	2.00
	Mrs. D. C. Noble, Middlebury, Vt.,	Second,	1.00
Delicious,	A. O. Ferguson, Burlington, Vt.,	First,	2.00
	C. L. Witherell, Middlebury, Vt.,	Second,	1.00
Fallawater,	W. C. Holcomb, Isle LaMotte, Vt.,	First,	2.00
	Eastern Fruit Co., Grand Isle, Vt.,	Second,	1.00
Pewaukee,	E. B. Parker, Milton, N. H.,	First,	2.00
	W. J. Conant, Hebron, Me.,	Second,	1.00
Scott,	Gulley & Brown, Rockville Ct.,	First,	2.00
	L. Putnam, Cambridge, Vt.,	Second,	1.00
Jacob Sweet,	A. B. Howard, Belchertown, Mass.,	First,	2.00
	W. H. Atkins, So. Amherst, Mass.,	Second,	1.00
Red Russet, Salome,	A. L. Fish, Colerain, Mass.,	First,	2.00
	L. Putnam, Cambridge, Vt.,	Second,	1.00
St. Lawrence,	Bearce Bros., Hebron, Me.,	First,	2.00
	A. A. Conant, Hebron, Me.,	Second,	1.00
Stark,	H. G. Bowman, Hebron, Me.,	First,	2.00
	J. F. Moody, Hebron, Me.,	Second,	1.00
Seek No Further,	Bearce Brothers, Hebron, Me.,	First,	3.00
	A. A. Conant, Hebron, Me.,	Second,	2.00
20 Ounce,	C. C. Leorler, Southampton, Mass.,	Third,	1.00
	A. T. Clark, Vergennes, Vt.,	First,	3.00
	W. F. Ranney, Putney, Vt.,	Second,	2.00
Swaar,	W. H. Atkins, So. Amherst, Mass.,	Third,	1.00
Walbridge,	S. E. Howard, Bennington, Vt.,	First,	2.00
	W. H. Atkins, So. Amherst, Mass.,	First,	2.00
Wolf River,	H. B. Chapin, Middlesex, Vt.,	First,	2.00
	D. R. Miller, Putney, Vt.,	Second,	1.00
Hyslop,	A. A. Halliday, Bellows Falls, Vt.,	First,	2.00
	W. R. Root, East Hampton, Mass.,	Second,	1.00
Six Winter Varieties,	A. H. Hill, Isle LaMotte, Vt.,	First,	15.00
	C. L. Witherell, Middlebury, Vt.,	Second,	10.00
	R. L. Hemenway, Middlebury, Vt.,	Third,	8.00
Best Plate Collection,	A. B. Howard, Belchertown, Mass.,	First,	25.00
	C. L. Witherell, Middlebury, Vt.,	Second,	15.00
	The Orchards, Bennington, Vt.,	Third,	10.00
Hamper of Apples,	W. A. Root, East Hampton, Mass.,	First,	8.00
	C. L. Witherell, Middlebury, Vt.,	Second,	4.00
	A. B. Howard, Belchertown, Mass.,	Third,	2.00

PEARS.

Anjou,	A. B. Howard, Belchertown, Mass.,	First,	\$3.00
	C. L. Witherell, Middlebury, Vt.,	Second,	2.00
	A. T. Clark, Vergennes, Vt.,	Third,	1.00
Clairgeau,	A. B. Howard, Belchertown, Mass.,	First,	3.00
Bosc,	A. B. Howard, Belchertown, Mass.,	First,	3.00
	Fred Steele, Stoneham, Mass.,	Second,	2.00
Lawrence,	A. B. Howard, Belchertown, Mass.,	First,	3.00
Seckel,	L. Putnam, Cambridge, Vt.,	First,	3.00
	M. A. Butterfield, Jacksonville, Vt.,	Second,	2.00
Sheldon,	A. B. Howard, Belchertown, Mass.,	First,	3.00
Vicar,	A. B. Howard, Belchertown, Mass.,	First,	3.00
Winter Nellis,	A. T. Clark, Vergennes, Vt.,	First,	3.00
	A. B. Howard, Belchertown, Mass.,	Third,	1.00
Vt. Beauty,	A. A. Halladay, Bellows Falls, Vt.,	First,	3.00
	A. B. Howard, Belchertown, Mass.,	Second,	2.00

COLLECTION OF PEARS.

A. B. Howard, Belchertown, Mass.,	First,	\$10.00
M. A. Butterfield, Jacksonville, Vt.,	Second,	8.00

VEGETABLES.

Onions,	L. Putnam, Cambridge, Vt.,	First,	\$1.00
Turnip,	L. Putnam, Cambridge, Vt.,	First,	1.00
Cabbage,	L. Putnam, Cambridge, Vt.,	First,	1.00
Carrots,	L. Putnam, Cambridge, Vt.,	First,	1.00

PREMIUM LIST FOR 1917.

All entries must be made in the name of the grower and the fruit must be of the exhibitor's production. Five specimens will constitute a plate exhibit. See previous reports for score cards.

CLASS I.—APPLES.

Plate Arctic	\$1.00	.50
" Baldwin	1.00	.50
" Banana	1.00	.50
" Baxter	1.00	.50
" Bellflower	1.00	.50
" Bethel .....	.50	.25
" Delicious	1.00	.50
" Fallawater .....	.50	.25
" Fameuse	1.00	.50
" Golden Russet	1.00	.50
" Hubbardston	1.00	.50
" King	1.00	.50
" McIntosh	1.00	.50
" McMahon White	1.00	.50
" N. Spy	1.00	.50
" N. W. Greening	1.00	.50
" Pewaukee .....	.50	.25
" Pound Sweet	1.00	.50
" Red Canada	1.00	.50
" R. I. Greening	1.00	.50
" Scott Winter	1.00	.50
" Shiawassee	1.00	.50
" Senator	1.00	.50
" Spitzenburgh	1.00	.50
" Stayman	1.00	.50
" Sutton	1.00	.50
" Tolman Sweet	1.00	.50
" Wealthy	1.00	.50
" Westfield	1.00	.50
" Wolf River	1.00	.50

	1st.	2nd.	3rd.
Best collection named varieties exhibited on plates (Separate exhibits) ..	\$5.00	\$3.00	\$2.00
Best display cooking apples on plates (Separate display)	5.00	3.00	2.00

Best display winter dessert apples on plates (Separate display)	5.00	3.00	2.00
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CLASS II.—ARTISTIC DISPLAY.

	1st.	2nd.	3rd.
Best artistic display other than boxes, barrels and plates	\$5.00	\$3.00	\$2.00

CLASS III.—PACKAGE EXHIBITS.

	1st.	2nd.	3rd.
Best exhibit of apples in box pkg. (3 boxes)	\$5.00	\$3.00	\$2.00
Best exhibit barrel pkg. (3 barrels)	5.00	3.00	2.00
Best single box of apples	5.00		
Best single barrel of apples	5.00		

CLASS IV.—EXHIBIT OF CANNED FRUITS.

	1st.	2nd.	3rd.
Best display canned fruit	\$3.00	\$2.00	\$1.00

CLASS V.—PEARS.

Plate Anjou	\$1.00	.50
“ Bosc	1.00	.50
“ Clairgeau	1.00	.50
“ Dutchess	1.00	.50
“ Lawrence	1.00	.50
“ Vermont Beauty	1.00	.50
“ Winter Nellis	1.00	.50
Best plate collection of pears	3.00	2.00

CLASS VI.—VEGETABLES.

	1st.	2nd.	3rd.
Best collection named varieties potatoes	\$5.00	\$3.00	\$2.00

Premiums of \$1.00 and 50 cents will be awarded for the best display of beets, carrots, celery, turnips, cabbages, onions, squashes and pumpkins. Only two specimens are necessary of the last two kinds; five specimens for all others.

1917 SPECIALS.

For best exhibit of 5 barrels, 10 boxes and 20 plates from any county, 1st, \$10; 2nd, \$5; 3rd, \$3.

For best display of cooked apple products in any of the 197 different ways, 1st, \$3; 2nd, \$2; 3rd, \$1.

The inside dimensions of a standard box are: length, 18½; height, 10½ and width 11½ inches. Spruce makes the best material for boxes.

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Buxton, Mrs. B. C.	Middletown Springs
Bristol, E. S.	Vergennes
Christopher, John	Jacksonville, Fla.
Clark, A. T.	Vergennes
Cummings, Prof. M. B.	Burlington
Darrow, Geo. M.	Dept. of Agr., Washington, D. C.
Darrow, Wm.	Putney
Dawley, F. R.	Montpelier
Dunbar, Mrs. F. W.	Manchester
Deavitt, E. H.	Montpelier
Emery, C. S.	Newport
Freeborn, A. C.	Proctor
Freeborn, Mrs. A. C.	Proctor
Hemenway, R. L.	Bridport
Hill, A. H.	Isle La Motte
Hartness, Mrs. James	Springfield
Hildreth, E. L.	Brattleboro
Howe, M. A.	Northfield
Knapp, C. E.	N. Bennington
Kneeland, D. A.	Waitsfield
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Ormsbee, C. O.	Montpelier
Parmalee, C. H.	Wilmington
Pease & Tinkham	Burlington
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Lutman, Prof. B. F.	Burlington
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Small, F. M.	Morrisville
Stafford, D. H.	Brattleboro
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 Vaughan, A. M. Shelburne

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 Alexander, W. H. West Brattleboro
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 Anderson, N. K. Middletown Springs
 Anderson, W. J. Mount Hermon, Mass.
 Armstrong, R. P. Amherst, Mass.
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 Bailey, George Newport
 Bailey, H. A. Bradford
 Bailey, J. A. Newport
 Baldwin, Hon. H. T. Wells River
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FIFTEENTH ANNUAL REPORT
of the
VERMONT STATE
Horticultural Society



PROCEEDINGS

of the

Twenty-First Annual Meeting and Exhibition
And First Annual Meeting Held in
Conjunction with the

VERMONT MAPLE SUGAR MAKERS' ASSOCIATION

at

Burlington, Vt., December 4-7
1917

Printed by
The St. Albans Messenger Co
St. Albans, Vt.

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ADDRESS OF WELCOME.

MAYOR J. HOLMES JACKSON, BURLINGTON.

Officers and Members of the Vermont State Horticultural Society and Vermont Maple Sugar Makers' Association:—It is my pleasant duty to extend to you all a warm welcome to our city. We are proud of the honor you have conferred on us by electing to hold you annual meeting here.

Burlington is the scene of many society gatherings but none more important than the societies represented here tonight that foster and build up Vermont's splendid resources, through their researches and experiments. We shall need those resources developed to the fullest extent in the months ahead of us. Forestry must take an important place. We must cut wisely and plant wisely, if we are to depend largely on our wood supply as we are told. And in regard to sugar shortage, here again Vermont trees can come to the fore and give us the sweets we crave.

Vermont maple sugar is known from Maine to California for the pleasure it gives. Now it can become a food necessity as well as confection. I fear some of the products bearing the title have never even had an ancestor in the Green Mountain State, but after all we should feel gratified that the word Vermont sells the goods, and pray that in some small measure at least the sugar may merit the honor.

The apple of Vermont is fast reaching the prominence it deserves. Each year more and more of the State's best fruit finds its market in the cities, and while it makes us here at home, if we wish to enjoy it, emulate the early bird and snatch, not the worm, but the apple, still it tends to the greater glorification of our sturdy little State.

But I am here to extend to you the hospitality of our city, not to talk to you of things you are all more familiar with than I am, and this greeting I give you most heartily. May your stay be so pleasant that you will wish to come to us again. I am sure each citizen will do his part to make it so.

RESPONSE TO ADDRESS OF WELCOME.

PRESIDENT E. H. WEST, DORSET.

Mr. Mayor, Ladies and Gentlemen:—It is certainly a great pleasure to be in this city, which is noted for its beauty culture, and on behalf of the Horticultural Society I thank you, Mr. Mayor, for this cordial greeting.

Some twenty-two years ago a group of interested fruit growers met here at the University and formed our organization. Since that time we have grown steadily until our membership is now about 500. We have made it a practice to hold at least one meeting every year, always in a different town, and in this way we have carried the gospel of better fruit over a large part of the State.

I need not tell you here that the Vermont grown Northern Spy or McIntosh cannot be equalled anywhere else, but unfortunately we have very few growers practicing the modern, scientific methods in fruit culture, but the few who have done so have demonstrated the possibilities of fruit growing in Vermont. Do you know that there are some of the most promising young orchards in the hill towns of southern Vermont, of all New England? There are four orchards in Bennington and Rutland counties with a total of 75,000 apple trees, and these are receiving the up to date care. When they come into bearing I feel sure that Vermont apples will be foremost in all markets.

I hope you people in Burlington are as glad to have us here as we are to be here, and we trust that your citizens will attend our meetings. I thank you again for your cordial welcome.

POLLINATION OF FRUITS.

PROF. W. W. CHENOWETH, AMHERST, MASS

In presenting this subject there are three fundamental principles I desire to discuss and if possible to prove: 1. Cross pollination of our orchard fruits is always desirable and frequently necessary. 2. The wind is not an efficient agent in distributing the pollen. 3. Bees are the all important agents in effecting cross pollination of our orchard fruits.

For the proof of these statements we must rely upon:—

1. General observation, which often times is as reliable as experiment, depending of course upon the observer. 2. Results of actual research. 3. Common sense reason and deductions based upon the above. It is upon the results of research that I desire to lay greatest emphasis. And an attempt has here been made to bring together all essential material relating to this subject that has so far been obtained by our experiment stations. I must beg your indulgence in presenting some of these experiments somewhat in detail as it is done for the purpose of placing before you the conditions under which certain results were obtained and will therefore enable you to form more accurate judgment as to the reliability of the evidence. However, before attempting to present this data I wish to discuss briefly the morphology and physiology of the flowers of our fruit trees.

The term fruit as it is ordinarily used means the pulpy mass connected with and surrounding the seeds of our various orchard plants. It develops primarily as a protection to the growing seeds which are the vital products of the plants.

Seeds are the result of the union of two unlike cells known by various names, but for our discussion we may call egg cell and sperm cell. These cells are produced in different organs in the flowers, sometimes in different flowers, more commonly in the same flower. Our common tree fruits such as apple, pear, peach and plum produce complete, perfect flowers: Perfect because they contain the essential organs of reproduction; complete because they contain all the floral parts, pistil, stamens, petals, sepals.

The essential organs of the flower are the stamens which bear the pollen grains or sperm cells, and the pistil

made up of ovary, style and stigma which bear the ovules or egg cells. These are soft single cells found in the ovary which is the tube like portion forming the base of the pistil.

When the ovules are ready to be fertilized the stigma prepares itself for the reception of the pollen. Usually this is effected by a gelatinous exudation making the surface sticky and forming a medium in which the pollen is readily caught. This deposition of pollen on the stigma is known as pollination. When the pollen grain on the stigma produces its pollen tube, which is an outpushing of the coat of the cell and this tube penetrates the stigma, passes thru the style, enters the ovary, attaches itself to the egg cell and when the nucleus of the sperm cell or pollen grain has passed through this tube and has become fused with the nucleus of the egg cell, then fecundation or fertilization has been brought about. This stimulus is necessary to start the growth of the flower parts which ultimately develop into the seed and fruit.

If these uniting cells, the egg and the sperm are borne by the same plant, or in the case of our orchard tree fruits by trees of the same variety, the process is known as self-fertilization and the plant is said to be self-fertile. If, however, these cells must be from different plants, or as in our orchard fruits from trees of different varieties the process is cross-fertilization and the plant is said to be self-sterile.

If plants are naturally self-fertile the question of pollination is as a rule quite simple; but if nature demands cross-pollination the problem becomes more involved. There must, in most cases, be some means to prevent self-fertilization and there must be some agency for transferring the pollen.

Thomas Andrew Knight a famous plant breeder of a century ago concluded from observation and experiment that nature intended the crossing of plants of the same species; but it required the master mind of Darwin to show the true value of cross-pollination and to work out the many interesting methods nature uses to bring this about.

Some of the more common methods by which plants avoid self-fertilization are; different periods of ripening of pollen and ovule, difference in length of styles and stamens, the placing of essential organs in different flowers, but the most common is the sterility of the pollen, i. e. the pollen born in a flower is impotent when placed upon the pistil of same flower or upon a flower of the same pomological variety.

Since our fruit crop depends almost if not altogether absolutely upon pollination and consequent fertilization, it is of vital importance to know the habits of our orchard fruits with respect to this important function.

Fortunately a few men have seen fit to investigate this problem and I now invite your attention to a brief consideration of their work.

M. B. Waite acting with the U. S. Dept. of Agriculture made the first extended orchard studies relating to this problem. His first work was with pears and his experiments were conducted about as follows. Strong manilla paper bags were placed over the clusters of buds and by fastening them tightly to fruit spur, all chance of foreign pollen entering was excluded. In order to offset any charge that these flowers were under unusually abnormal conditions other clusters were enclosed in bags of cheese cloth and still others in bags made of coarse mosquito netting. These last two would permit of free circulation of air and would not therefore place the enclosed flowers under unnatural conditions. It might be stated here that the results obtained from the use of the three types of bags were essentially the same, at least no marked difference was noted.

Of the more important varieties tested it was found that Angoulene, Buffum and Flemish Beauty were reasonably self-fertile; Bartlett, Bosc and Seckel partially self-fertile, the trees tested varying from self-sterile to an average of 1.45% self-fertile; while Anjou, Clairgeau, Clapp's Favorite, Keiffer, Lawrence and Sheldon were self-sterile or practically so as none of these showed a greater degree of self-fertility than 0.4%. It was noticed in these tests that trees of the same variety showed quite a wide range in their ability to self-fertilize. Bartlett for example showed a range of 0.% to 4.4%. This individual variation is no doubt due in a large measure to the vitality and vigor of the tree. While these results are not to be taken as final nor as applicable to all seasons and localities the very fact that of all the varieties tested more than half are practically self-sterile under the conditions imposed is rather significant.

The above results obtained in New York are corroborated by observation and experiment in the old Dominion orchard at Chestnut Farm, Virginia. This old orchard originally consisted of some 22,000 standard Bartlett pear trees and were at the time of this experiment, 1892, eighteen years old. This orchard had never borne a full crop. The

largest crop was an average of three pecks per tree. Blight, root rot and other causes had removed about one sixth of the original planting. These missing trees had, in the earlier history of the orchard been replaced. By mistake, in replanting two Clapp's Favorite and a Buffum had been set among the Bartletts. Also near by were a few old trees, the remnants of a former variety pear orchard which had been very productive and because of this the larger planting had been made.

The Bartlett trees near the old variety orchard and those near the two Clapps and Buffum always bore good crops when there were any pears in that section and the drooping branches of these trees testified to the truth of the manager's statement respecting this. The same experiments were tried here as in the New York orchards. Also much cross pollination by hand was done. In no case where Bartlett pollen was applied to Bartlett pistil did fruit set, while a very large percent of the flowers cross-pollinated set fruit.

Mr. Waite also investigated the apples using the same methods as with pears. He found that a very large percent of the varieties were either self-sterile or only partially self-fertile.

Mr. Fletcher's work extending over a period of three years in both Michigan and West Virginia corroborates Mr. Waite's results with respect to Kieffer and Bartlett pears. Mr. Fletcher confined his efforts to these two varieties and the results from the thousands of blossoms experimented with should be conclusive. Neither of these varieties show sufficient self-fertility to warrant setting them without provision for cross-pollination.

In 1897 Professor Waugh of the Vermont Experiment Station began a series of experiments with plums to determine if they were self-fertile or self-sterile. Some of this work was done in Vermont and some in the large orchards of Mr. Kerr, of Denton, Maryland.

His method of procedure was essentially the same as that of Mr. Waite. Large clusters were enclosed in paper bags. When the pistils were receptive some of the bags were removed and the flowers hand-pollinated with the pollen found in the bag or in enclosed flowers. The remaining bags were allowed to remain until petals had dropped. No appreciable difference was noticeable in these two methods of treatment. Altogether some 55 varieties of

native and 5 varieties of Japanese plums were tested. The results show that for all practical purposes all species of native plums are absolutely self-sterile, and while it is generally believed that some varieties of the Japanese group are self-fertile the varieties here tested were self-sterile. All general observation confirms this conclusion especially regarding certain species of native plums.

Professor Waugh's studies in pollination also included the apple. The method of procedure was essentially the same as with the plums. Of the varieties studied Baldwin, Esopus, and Fameuse showed some degree of self-fertility, while Ben Davis, Rhode Island, King, Spy, Red Canada, Roxbury, Tolman, Wealthy, Westfield and Williams proved to be self-sterile.

In the spring of 1898 Prof. Lewis of the Oregon Experiment Station began the investigation of the apple. His method was practically the same as that of Professor Waugh except that in each case the bags were removed from one half of the clusters when the pollen was ripe and the pistils of the flowers were hand pollinated, using the pollen from the enclosed flowers. The bags were then returned to keep out any foreign pollen. The remainder of the bags were left untouched until the petals had fallen, at which time all of them were removed. In addition to this work in self-pollination much work was also done in cross-pollination. Altogether results were secured from 87 varieties 59 of which were found to be self-sterile, 15 self-fertile and 13 partially self-fertile.

Of the varieties important to the New England fruit grower Baldwin, Ben Davis, Esopus, Fameuse, Grimes and Newton were either self-fertile or partially so, while Graevenstein, Jonathan, King, Maiden Blush, Rhode Island Greening, Tolman and Wealthy were self-sterile.

The only difference between the above results and those obtained by Prof. Waugh are a larger set of fruit in the self-fertile sorts and the self-fertility of the Ben Davis which was reported self-sterile by Prof. Waugh. This difference only serves to emphasize the statement that the degree of self-fertility of any variety is subject to variation depending upon vigor, location, season, etc.

Senator Dunlap, one of the large fruit growers of Illinois says that in his state where there are many large orchards of 40 to 80 acres of a single variety seldom or never bear large crops, while mixed orchards in the near vicinity often produce bumper crops. He further states

that where orchards are set in small blocks of different varieties that the first and second rows along side another variety bear the larger crops and that the crop decreases toward the center of the block.

V. R. Gardner of Oregon investigated the sweet cherries in 1911, 1912 and 1913, and reports that of eleven varieties studied Lambert and possibly Knight may be classed as self-fertile; Wood, Elton, Rockford, and Windsors are partially self-fertile and Williamette, Napoleon, Coe, Bing and Black Republican are self-sterile.

Dr. Whitten of Mo., Prof. Beach of N. Y., Prof Stearns of Ga., Prof. Reiner of N. C. and others have shown thru exhaustive trials that a large per cent of our grapes are incapable of setting fruit unless cross pollinated. This is especially true of the native and *Vinifera* hybrids and the *Muscadines*.

The general opinion seems to prevail that peaches and European plums are self-fertile. There is little actual data outside of general observation to be had relating to these two groups of fruits.

Fletcher reports as a result of experimental work and from reports of several hundred fruit growers that of the European plums, Golden Drop, French Prune and Italian Prune are risky, being variable in their power to self-fertilize. Of the peaches *Susquehanna* is classed with the above varieties of plums, while Gold Drop is classed as self-fertile.

The effect on the fruit itself resulting from cross-fertilization was investigated quite thoroughly by many of these men. Waite and Fletcher agree that the size and form of the pear is modified by crossing and that the normal typical fruits and usually the finest and largest specimens even in self-fertile varieties are from crosses. Both Waite and Lewis studied the effect of crossing the varieties of apples. Waite found that the unsatisfactory character of the fruits obtained from self-pollination was even more pronounced in apples than in pears. The crosses correspond to the better specimens in the tree while the self-fertilized fruits correspond to the undersized, poorly colored specimens. Prof. Lewis goes a step further and gives actual figures obtained from comparison of a large number of specimens. The following table shows the effect of cross-pollination of the Yellow Newton a self-fertile variety, and Esopus a partially self-fertile variety.

EFFECTS OF CROSS-POLLINATION, OREGON EXPERIMENT STATION, 1908.

Newtown. Pollination.	Average weight of fruit.	Average weight of seeds.
x Self	73 grams	.05 grams
x Bellflower	104 "	.40 "
x Esopus	147 "	.66 "
x Jonathan	162 "	.65 "
x Grimes	173 "	.60 "
Esopus.		
x Self	100 "	.13 "
x Newtown	126 "	.65 "
x Ark. Black	128 "	.68 "
x Jonathan	144 "	.70 "
x Baldwin	157 "	.71 "

No comment on the above is necessary as the figures show plainly enough.

AGENTS OF CROSS-POLLINATION.—While working on the problems of self-fertility of the various orchard fruits some of the investigators also made a definite study of the means used in bringing about cross-pollination.

It has been mentioned that Mr. Waite used a coarse mosquito netting for covering pear blossoms; such a covering would not materially interfere with cross-pollination if the wind distributed the pollen, but would if properly adjusted exclude insect visitors. His results show no variation from those in which the clusters were enclosed in paper bags. Fletcher used this same covering for large trees and while a few more fruits were set than on trees covered with sheeting he attributed it to the fact that where blossoms were closely pressed against the netting insects were able to cross-pollinate them.

Prof. Waugh also used the mosquito netting in his work with plums. His records show no variation from those obtained where paper bags were used, except in the case of the Cumberland which set two fruits, and these he maintains were the result of insect work as some of the blossoms were found pressed closely against the netting.

Prof. Waugh also prepared glass plates 1x3 inches by smearing one side with vaseline. These were exposed in the plum orchard and later a count made of the pollen collected. The first column in the table designates the glass plate, the second the distance from a tree in full bloom, the third its position and height from the ground, H meaning the plate had a horizontal position and V that it was vertical

to the tree and facing the wind, the fourth the length of exposure and fifth the amount of pollen both as single grains and as masses.

**WIND AS AN AGENT IN CROSS-POLLINATION.
(VERMONT EXPERIMENT STATION, 1900.)**

Plate No.	Distance from tree.	Position and height.	Time of exposure.	Am't of pollen grain.	mass.
A	10	H. 6 ft.	24 hr.	0	0
B	15	V. 6 "	24 "	1	0
C	10	V. 6 "	24 "	25	25
D	under tree	H. 0 "	2 "	0	1
E	8	H. 2	20½	7	7

Most of the pollen found on the plates was in the form of masses rather than single grains. This shows its sticky, doughy nature, also its non-adaptability to being carried by the wind.

Prof. Lewis repeated this experiment in his work with apples with results as shown in table below.

**WIND AS AN AGENT IN CROSS-POLLINATION.
OREGON EXPERIMENT STATION, 1908.**

Slide No.	Dist. from tree.	Height of slide.	No. pollen grains after 24 hours.
1	4 feet	on ground	16
2	12 "	6 feet	9
3	15 "	6 "	7
4	15 "	9 "	6
5	20 "	6 "	8
6	30 "	4 "	11

Keeping in mind the relative size of a stigma and one of these glass plates one can readily see that if the fruit crop depended upon cross-pollination by the wind the chances for a bumper crop would be remote indeed.

Still another experiment tried out by Prof. Lewis shows rather significant results. A seven year old tree having 1500 blossoms stood about 20 feet from trees in heavy bloom. The flowers of this young tree were emasculated (i. e. all floral parts, except pistils were removed.) The result was that five fruits set on the tree. A watch was kept on the tree to see if insects visited it. During the time when the pistils were receptive eight bees visited the tree, while more than twice that number were seen in a half hour on another tree 20 feet distant.

Scientists have long pointed out the fact that those plants which depend upon the wind to bring about cross-pollination are as a rule distinguished by having an abundance of powdery pollen, by the absence of nectar glands and also by having flowers that are not showy. While on the other hand those plants that depend upon insects to bring about cross-pollination are characterized by having showy flowers, nectar glands and sticky or doughy pollen. Also many of these flowers emit a perfume. Whatever value, if any, may be attached to this generalized statement it is curious to note with the plants under discussion that orchard fruits, without exception belong to the last named class.

INSECTS AS POLLINIZERS.—The foregoing experiments indicate quite clearly that the wind cannot be depended upon to bring about cross-pollination of our orchard fruits, consequently with its elimination it necessarily follows that this important work must be done by the insects found in our orchards at blooming time.

Prof. Waugh kept a record of the various insects seen visiting the plum blossoms. In 1898 twenty-eight species were counted; of these eighteen species were Hymenoptura or bees. In 1899 there were sixteen species of which seven were bees or their allies and nine species of flies. While no actual figures are given the general statement is made that of all the species the honey-bee is by far the most important.

Mr. Gardner in reporting his work on sweet cherries cites the case of an orchard which had not as yet produced a heavy yield. The crop of 1912 was 13 tons. Acting upon his recommendation the owner of the orchard in 1913 cut branches from seedling cherry trees at blooming time and placed them in buckets of water throughout his cherry orchard. In addition to this several colonies of bees were placed in the orchard. With no better season and with the trees only one year older the crop was 39 tons. Mr. Gardner in commenting on this attributes a large part of this increased yield to effective cross-pollination and bees as the agent.

Mr. F. Howard Brown Sec'y of the Massachusetts association writes me that the severe winter of 1911 and 1912 together with foul brood very greatly reduced the number of bees throughout the state. In his own case only one colony survived. In the spring of 1912, the weather during blooming time was cool, cloudy and rainy, with only short intervals of sunshine. During these short periods of sunshine the bees would come out and visit a nearby cherry

tree, but would not venture into the peach orchard some 300 feet distant. Only one bee was seen among the peach blossoms.

This colony of bees was moved into the center of a small block of peach trees so that when they did come out they would work upon the peach blossoms. The result was these trees set all the crop they could carry thru the following dry season. While other peach orchards that bloomed equally well, but did not have bees in them failed to set a crop.

Mr. Brown feels confident that this single colony of bees is responsible for his 1912 peach crop in this particular orchard and recommends all fruit growers to keep bees as a sort of insurance.

By carefully studying the habits of bees during the blossoming time of our orchards the Ohio Experiment Station has been able to give us a rather definite idea of the amount of work that may be accomplished by a single colony of these useful insects.

TABLE SHOWING ACTIVITY OF BEES AT BLOOMING TIME.
OF PEACH AND CHERRY AT OHIO EXPERIMENT STATION.

Time.	No. hive.	Outgoing workers per min.	Returning workers per min.	Loaded with pollen.	Loaded with honey
8.30-9 A. M.	1	35	30	22	8
	2	40	31	20	11
11.30-12 "	1	40	42	8	34
	2	48	51	5	46
2.30-3 P. M.	1	78	81	2	79
	2	84	95	2	93

When we remember that the bee may visit several flower clusters in a minute, we realize that thousands of flowers will be visited by the workers of a single colony a day. They cost the fruit grower nothing. They take from his trees nothing that he can utilize and they render a service invaluable.

By actual count in orchards, favorably located, the honey bee has been found to outnumber all other insects 20 to 1. This is no more than we should expect if we remember that the common bees are the only insects that live through our severe winters in considerable numbers. At blooming time colonies of bees number around 15,000 while practically all other insects which have been so reduced in

numbers that only eggs or single females successfully pass through the winter have not had sufficient time to multiply and produce large numbers. And herein lies one of the very strong arguments in favor of the honey bee.

THE PACKING OF APPLES IN BOXES AND BARRELS.

BY W. H. WOLFF, ASSOC. PROF. OF HORTICULTURE, NEW HAMPSHIRE COLLEGE.*

The subject of apple packing is always an interesting and important one to every fruit grower, since we all have to do more or less of it every year,—the more the better,—and since because on our skill and methods in packing depend to so considerable an extent the profits from our orchards. I believe the essentials of good packing may be summed up as follows:—

1. Our methods must be economical—we must constantly be on guard to eliminate useless labor and expense.

2. Packages must be well adapted to the kind and grade of fruit and the particular class of purchasers for which they are designed.

3. Packages must be attractive. They and the fruit contained must make a good appearance so as to attract and command attention.

4. The packing must be honest. Having attracted attention—having caused the public to stop, look and examine, the contents must stand critical inspection. No apologies are now in order and the top layer must actually be representative of the whole.

So much then for the essentials of this work, we will now show our lantern slides and proceed with the details of the actual work of packing.

BARREL PACKING.—Uniform sizing and grading are the first essentials and this better be done under cover rather than in the orchard. A good mechanical sizing machine is almost a necessity even in comparatively small orchards. Hand labor is too slow, too expensive, and the eye is not as exact as the machine in separating out the different sizes. A barrel of good 2¼ to 2½ inch Baldwins will please a customer, but if one mixes in some 3 to 3¼ inch fruit then the smaller will look like marbles and the customer will feel he is being cheated. Where possible one

*NOTE—The pictures shown in this article were made by the author and are kindly loaned for this report by the N. H. Expt. Station.

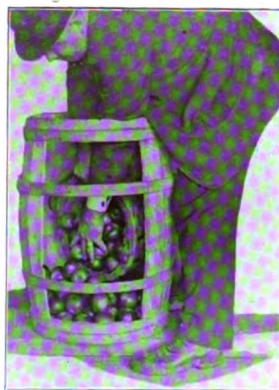
should also grade for color as well as for size and freedom from imperfections. Many growers are doing this with profit by placing one man at each sizing pocket or chute to sort the fruit for imperfections and color as the machine delivers it. With fruit graded in this way there should be no need for or apparent advantage in overfacing.

About a peck of apples are picked out truly representative of the grade to be packed—long stems on these apples are clipped, using for this a pair of side cutting wire nippers. Barrels for packing and racking will be set on a concrete floor or better yet on a two inch solid heavy plank about 12" to 14" wide. A barrel will now be opened and all nail points turned down, then a corrugated or pulp board cap will be placed in the barrel and on this, if one chooses a lace circle and perhaps advertising matter giving the name and address of the grower, name of the variety, its special uses and other statement of good advertising value. Then the apples previously selected will be carefully emptied in and placed in tight concentric rings, stems down. In the chinks or spaces between these fruits of the first layer a second layer will be placed, bright cheeks down. A half bushel swing bale basket of the same grade of fruit will now be placed in, and the barrel gently shaken. As each succeeding basketful is placed in the barrel, resting on a good solid foundation—concrete floor or 2" plank—will be very thoroughly racked to settle the fruit and cause it to take up all the spare space in the barrel. This racking consists of a series of short, quick jars and does not call for the throwing of the apples on the surface from one side of the barrel to the other as is often done by the novice. Racking is of the greatest importance since it is the only way in which barrels can be packed so as to stand the shaking in transportation and arrive full and tightly packed. Excessive pressing will not enable barrels to arrive tight since this only tends to crush the fruit and cause it to rot quicker than it otherwise would. Barrels often arrives slack and at the same time show by the crushed fruit on the tail end that they were over-pressed.

When the barrel is within about an inch of being full a padded follower is placed on the fruit, and with the hands grasping the far side of the barrel the elbows and the weight of the body resting on the follower, the barrel is again racked. Another method is to have the follower weighted and still another is to use the screw press gently on the follower. Any one of these methods results in more thorough racking and a level surface on which to tail up the last layer. This tail layer, should be packed as nearly



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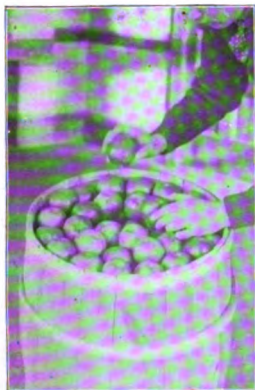
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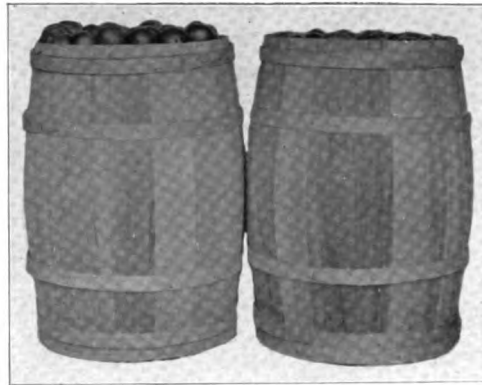


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1. Side of barrel removed to show the placing of the face layer.
2. Side of barrel removed to show care needed in emptying fruit from basket into barrel.
3. Racking barrel after each basket-full of fruit has been put in.
4. Placing last basket of fruit into barrel before using padded follower.
5. The padded follower.
6. Placing last apple in tail layer.
7. Putting in the head by the use of the barrel press.
8. The finished barrel inverted and opened showing part of face layer, lace circle and corrugated cap.



9



10



11

9. Fruit in barrel at left too high; fruit in barrel at right at correct height.

10. Using barrel press to force down cover on the barrel shown at the left in Fig. 9 with the fruit too high.

11. Result of the excessive pressing which was given barrel referred in Figs. 9 and 10.



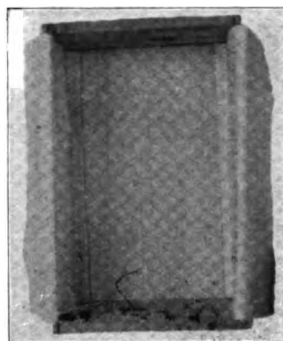
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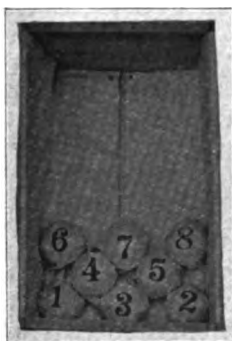
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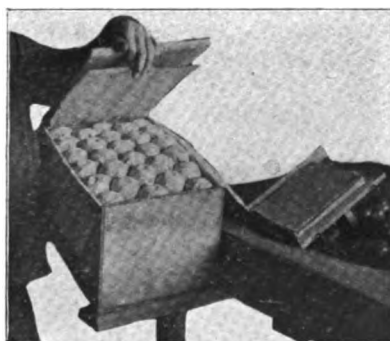
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13. Box packing at New Hampshire College, showing packing tables and equipment.

14. The standard box with liner papers and corrugated cap in place ready for packing.

15. The start of the 3-2 pack.

16. The start of the second layer in the 3-2 pack.

17. The start of the 2-2 pack.

18. A 3-2 packed box of 138 size opened, showing face, liner papers thrown back and pulp board cap and cover raised.

as possible in tight concentric rings stem ends up and should be level with the top of the staves or at the most should project not more than a half inch above them. A pulp board or corrugated board cap will now be placed on the tail layer, the screw press adjusted and while this is being turned down by one hand, using the long lever arm, the other hand holding a hatchet will with light strokes assist the work of the press in gently and slowly forcing the head down into the groove. The first hoop will be driven flush with the top of the staves, using a hard wood block to prevent its splitting or breaking. It will be nailed using on the average six or eight $1\frac{1}{4}$ inch square cut shingle nails. Two liner strips will be nailed into position across the ends of the head pieces and with this done the barrel is ready for stenciling.

The New England fruit grading and packing laws now almost uniform in all respects require the following marks to be shown on the head of the barrel in plain block letters of not less than one-half inch:—

1. The name of the grade.
2. The name of the variety.
3. The name and address of the person by whose authority the fruit is packed.
4. The minimum size of the fruit contained.
5. The statement that the barrel is a standard barrel.

We use for this work brass stencil plates, a good stiff brush and a stencil ink made of lamp black and turpentine mixed into a thick black liquid.

BOX PACKING.—In speaking of box packing as applied to apples we usually infer the use of the "standard" Western apple box.

The wood of which the standard apple box is made should be strong and tough, free from large knots and should not impart its odor to the fruit. Spruce is usually considered the best lumber to fulfill these requirements. Practically all western boxes are made from the western species of spruce.

The materials for the "Standard" apple box are as follows:—

Ends.— $\frac{3}{4}$ " x 10" x $11\frac{1}{2}$ " each in one piece.

Sides.— $\frac{3}{4}$ " x $10\frac{1}{2}$ " x $19\frac{1}{2}$ " each in one piece.

Top and Bottom.— $\frac{1}{4}$ " x $51\frac{1}{2}$ " x $19\frac{1}{2}$ " two each for top and bottom; four to each box.

Cleats.— $\frac{3}{8}$ " x $\frac{3}{4}$ " or $\frac{7}{8}$ " x 11", four to each box.

The materials when properly nailed give a box with the following **INSIDE DIMENSIONS**: Length 18", width $11\frac{1}{2}$ ", depth $10\frac{1}{2}$ ".

The capacity of this box without any bulge is approximately 2,173 cubic inches. When the box is properly packed and given say a bulge of three-quarters of an inch on both top and bottom as is advised, these bulges figure as the approximate equivalent of an extra half inch in depth of the box without distention of its parts and its capacity is increased by approximately 104 inches or about five per cent, giving a total capacity of 2,277 cubic inches.

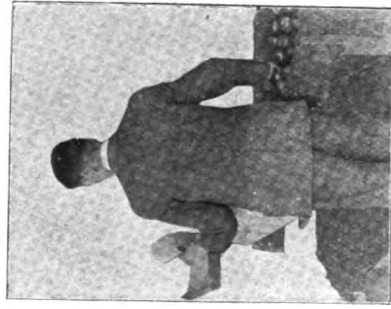
Since the United States bushel contains 2,150.42 cubic inches, a well packed apple box with three-quarter inch bulge on top and bottom contains about 1.06 bushels.

This standard box has many advantages some of which are as follows:—It is well adapted to tender skinned varieties like Northern Spy, McIntosh and Gravenstein, which show bruises readily, it is easily handled and stored and ships snugly, it is a more convenient retail unit than the barrel and will enable the consumer to deal more directly with the grower since the average family can easily consume a box of apples quickly while in first class condition whereas a barrel would likely have one half of its contents in poor condition before it could be used.

THE STANDARD BOX STANDS FOR QUALITY.—Growers in New England should spare no effort to maintain the high standard of quality for which the standard box has always stood. The fruit should be grown under a well planned system of soil management and should be most carefully sprayed so as nearly as possible to eliminate injury from insects and fungous troubles, avoiding at the same time spray injury. In addition to these usual orchard practices it is necessary to thin the fruit for box packing so as to bring out the best size, intensity and uniformity of color, and freedom from insect, disease and mechanical injury.

Only such fruit as is shown in the hall on the best plates and in the best boxes is worthy to go into the standard box.

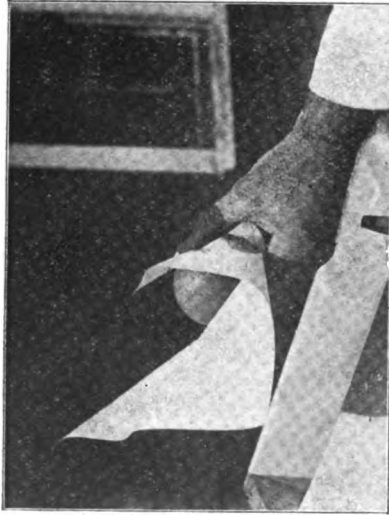
FAIR SIZE AND UNIFORMITY OF SIZE ESSENTIAL.—Large size is not considered of extreme importance by western growers in determining grade, but of course fair sized fruit should be used as it is appreciated by the market and is cheaper to pack. New England growers should aim to pack nothing smaller than 138 to the box and the most common packs of such varieties as Baldwins, Northern Spy and McIntosh will run, and be packed, as follows:—



A.



E.



C.



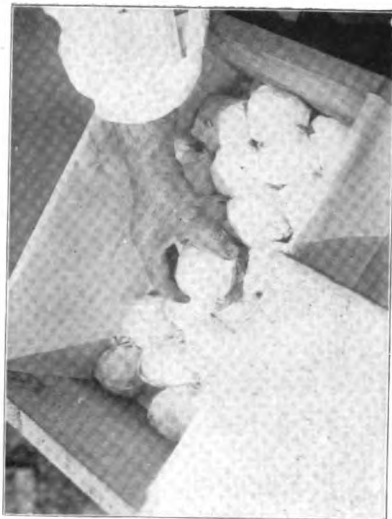
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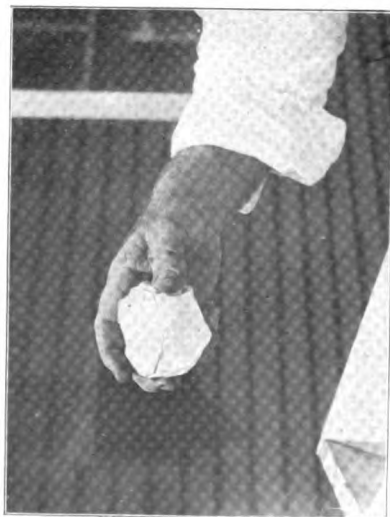
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I.



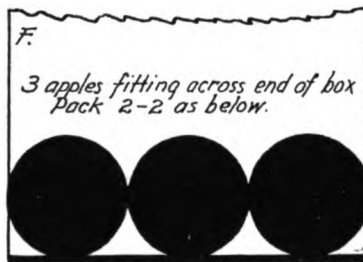
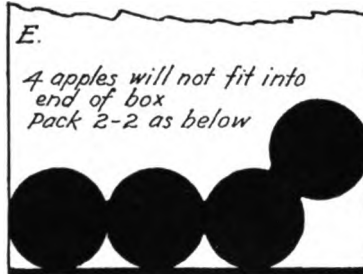
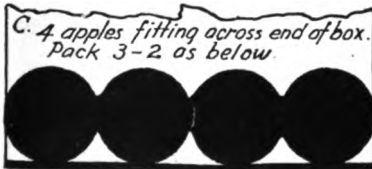
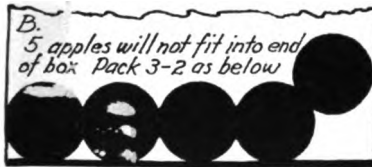
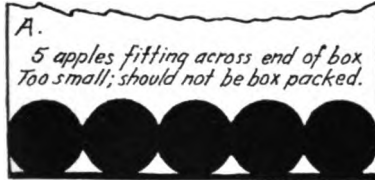
F.



H.

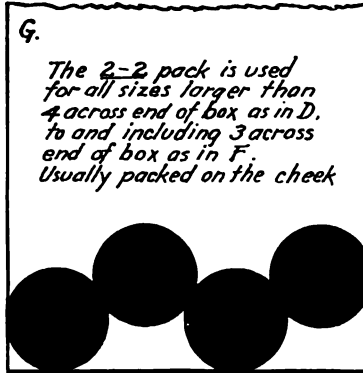
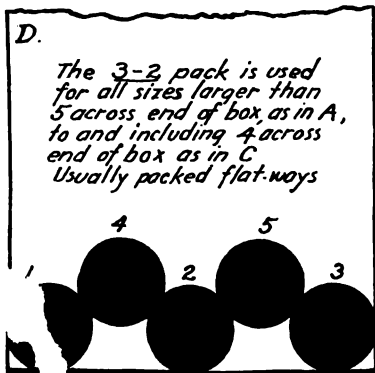
DIAGRAMS ILLUSTRATING STYLE OF PACK TO USE FOR A GIVEN SIZE OF FRUIT.

All fruit will be packed diagonally, using either the 3-2 or the 2-2 style according to how the size fits into the end of a standard apple box.



The 3-2 Pack.

The 2-2 Pack.



138	3-2 diagonal	5-6 long	5 tier deep.
125	3-2 diagonal	5-5 long	5 tier deep.
113	3-2 diagonal	5-4 long	5 tier deep.
120	2-2 diagonal	7-8 long	4 tier deep.
112	2-2 diagonal	7-7 long	4 tier deep.
104	2-2 diagonal	7-6 long	4 tier deep.
96	2-2 diagonal	6-6 long	4 tier deep.

UNIFORM SIZING ESSENTIAL.—Uniformity of size is of extreme importance in box packing. Wherever possible a good sizing machine should be employed because it will handle the fruit as carefully as can be done by hand, will size it with greater accuracy and withal will do the work at less cost and more quickly. Where sizing is done accurately and uniformly three-fourths of the troubles found by beginners in box packing are eliminated. Sizing is so important that we usually try to teach students to recognize and assort sizes before doing anything else in box packing.

OTHER REQUISITES FOR BOX PACKING.

THE PACKING TABLE.—A packing table is a necessary piece of apparatus in box packing. A suitable one is made 3 feet high, 4 feet long and 3 feet wide, the top is made of denim or canvas tightly and securely fastened to the upper edge of a 1" x 4" board forming the upper frame, the same being nailed securely to the outer upper edges of the 3' legs, which should be well braced.

Brackets or box rest supports as shown in the cut are attached at two diametrically opposite corners. This table will hold about three bushels of fruit and will very soon acquire the necessary sag to the cloth top.

CORRUGATED PAPER CAPS.—A corrugated paper cap should be used on the tops and bottoms of all boxes. Formerly it was the custom to place a pulp board cap between each layer, but this is not now done as a more solid pack can be put up without them.

LINER PAPERS.—Apple boxes should be lined with paper. Any good clean white paper, fairly tough, will do; regular liner papers can be bought. The size is 18" x 24" and two pieces are used for each box.

APPLE WRAPS.—The wraps should be of white or light colored paper, the usual size is 9" x 9" or 10" x 10". It will often be good advertising to have the owner's name, the orchard name and trade mark stamped on all or a few wraps.

WRAPPING.—When packed for commercial purposes usually all apples in the standard boxes will be wrapped. Sometimes a few apples forming some design as a circle or diagonal cross are left unwrapped to designate the grade. For exhibition purposes the top layer of the standard box is usually required to be without wraps. Figures illustrate the different movements in wrapping are so plain that it is believed further explanation will not be necessary. A rubber thumb-cot is usually worn on the thumb of the left hand to facilitate picking up the wraps.

PAPER HODS.—These are wooden or metallic trays about 12" square with bracket and hooks which are hung at the side of the box with the purpose of holding the wraps handy and ready for use.

THE DIAGONAL PACK.—Formerly it was customary to use three styles of pack, namely the square, the offset and the diagonal. Today only the diagonal pack is used, and of this there are only two variations, the 2-2 and the 3-2 diagonal.

THE 3-2 PACK.—Apples in this pack are usually packed on the flat, but long varieties like Belleflower, Chenango, and Williams Favorite are perhaps better packed on the cheek. The first layer is started as shown in Figure 15 and the start of the second as in Figure 17.

The fruit as it is packed into the box is pressed or pulled down towards the packer, every once in a while so as to keep the pack tight and help give the correct bulge. Care should be taken to keep the alignment perfect as the packing progresses. The 3-2 pack always runs five tiers deep.

THE 2-2 PACK.—This pack is always packed on the cheek. It is usually conceded to be the most attractive style of pack we have and is the only one which can be depended on to win prizes in exhibitions where the competition is close.

HEIGHT OF ENDS AND BULGE.—The last layer of fruit should present a well rounded bulge of something over an inch in the middle of the box, the surface sloping till level with the ends of the box. The bulge when the cover is nailed on should be $\frac{3}{4}$ " on both top and bottom.

THE NAILING PRESS.—A good nailing press is shown in Fig. 13. It is always desirable to have a good press if much boxing is to be done, but it is not absolutely necessary.

NAILING THE BOX.—All apple boxes should be nailed with $1\frac{3}{4}$ " special glue (cemented) coated box nails since these are the only ones which will without fail hold the package together and assure its arrival in good condition.

THE BOSTON MARKET GARDENERS' BOX.—The Boston Market Gardeners' Box is a package which has recently become very popular for apples in Massachusetts and New Hampshire. Its inside dimensions are 18"x8"—ends are $\frac{3}{4}$ " stock, sides $\frac{3}{8}$ " and bottom $\frac{1}{4}$ ". Often as used for apples a half inch cleat is nailed to the upper edges of the two end pieces and when so packed its capacity is 27 54 cubic inches—approximately 1.28 bushels or a little over one bushel and a peck.

This package costs about 18 cents but an 8 cent rebate is allowed by commission men for this package thus often reducing the net cost to about 10 cents. The Boston Market Gardeners' Box has many advantages:—

1. Its cost is fairly low.
2. It presents a large show surface in proportion to the contents.
3. The fruit in it handles without much bruising and keeps well in storage.
4. Expert packers with considerable training as are necessary for "standard box" packing are not needed, the ordinary farm help can readily do this work.
5. When packed with a corrugated pulp board cover held down with lath slats this package is declared to be "not a closed package" and so does not come within the scope of the fruit packing laws.

One layer only, the first one placed in the box, is faced. The diagonal method as used in the "standard boxes" makes a very fine appearance here. After the first layer the fruit is put in loosely as in barrel packing and is shaken down so as to get it tight. Corrugated paper caps are used for top and bottom. The use of the half inch cleat on the face end allows this face when the cover is removed to stand up a half inch above the edge of the box and makes for attractiveness. This package is now becoming very popular in New England and probably has a good future.

BEAN DISEASES IN VERMONT.

H. E. BARTRAM, AGRICULTURAL EXTENSION SERVICE,
UNIVERSITY OF VERMONT.

Everyone, nowadays, is familiar with the word disease, but perhaps one is not apt to think of it in connection with plants as much as in connection with the animals and with the human body. All plants, however,, are more or less

affected; and, as in the case of animals and in man, plant diseases seem to be increasing year after year. Not many years ago the more destructive diseases of plants were much less common than they are today. But through the introduction of new varieties from foreign countries and also through the purchasing of seeds and plants from outside our boundaries there has been brought along with them some of our most serious diseases and insect pests.

Now that these diseases and pests are ever present with us, the next step is to guard against their ravages as far as possible so that they will not gain the upper hand and prevent the raising of normal crops in this day of great need. Of course, there are other agencies such as unfavorable conditions of weather and of soil, and the premature ripening of seed with consequent poor germination, over which there is little or no control. But by choosing as good seed as possible and putting that seed in suitable soil it is possible to a large extent to establish healthy plants which will not be as susceptible to disease as those plants which are not given a fair chance.

The object of this paper is to inform you about some of the common diseases and insect pests of beans. From the experience of the past season it would seem as though it was time to take a definite stand and try to do all possible to prevent such losses as occurred during 1917. The weather conditions during this past year were very favorable to almost all plant diseases, but no one can tell whether the coming season will be better in that respect. One must be prepared for the worst and hope for the best. But the *best* can be helped if each grower will start now to make his crop better. By getting ahead of the diseases and keeping ahead of them one can reduce the losses, even in bad seasons, to very little or perhaps nothing.

This article has to do with only those bean diseases which are of serious trouble in our own state. It does include, however, one insect pest which seems to be very common this year, and which needs attention in many cases at this very moment.

The principal diseases of beans are caused by both fungi and bacteria. The fungi are the source of such diseases as anthracnose, while the bacteria cause bean blight. The fungi or molds are themselves plants, but plants without roots, stems, leaves or coloring matter, consisting only of tiny thread-like strands which attack the tissues of the higher plant and get therefrom their nourishment. This entrance of the fungus into the plant tissues

causes a wilting, darkening or other condition in the bean plant which we soon notice and say that the beans are diseased, as indeed they are.

The bacteria, also, are plants, but even of a lower order than the molds; they consist of but a single minute cell. Under suitable conditions bacteria multiply very rapidly and gaining entrance thru wounds or other openings into the bean plants they grow therein using up the food intended for the plant, soon causing a wilting and later the death of the plant. This, in general, shows that disease is often a condition where one plant lives at the expense of another plant, usually that plant in which the grower is most interested.

The fungus diseases of beans commonly found in Vermont and those which are most destructive are the "pod spot, or anthracnose; the dry root rot, a new but serious trouble; and the true bean *rust*. The only important disease of beans caused by bacteria is the bean blight, but this was quite serious last season. The insect pest which is causing serious trouble this year is the bean weevil. Taking these diseases up in their order of importance the anthracnose is by far the most serious and will be the first considered.

ANTHRACNOSE or "pod spot" is very commonly referred to as *rust*, but it should not be called rust for true bean rust is usually not a serious trouble. While on the other hand, anthracnose is the most common disease that is seriously reducing the yield of beans in most sections of the country. Anthracnose is a parasitic mold which may occur on all parts of the plant except the roots. The thread-like strands of the mold penetrate the tissues of the bean to obtain food for their growth and development, and they produce *spores* that serve the purpose of seeds. By means of these spores the fungus spreads to healthy beans and so reproduces itself. The fungus is too small to be seen with the naked eye, but by aid of a microscope its true character may easily be observed.

APPEARANCE ON THE SEEDLINGS.—Anthracnose makes its first appearance on the bean seedlings as they come up. It may be detected as brown, discolored sunken spots or cankers on the seed leaves or on the stem. This early appearance of the disease is due to the fact that the fungus is usually carried over winter in the seed. In severe cases the spots or cankers may be so numerous as to cause heavy loss in the seedlings and result in a poor stand. Usually so few of the seedlings are attacked that the presence of the disease in a field is at first overlooked. Nevertheless,

as the season advances the fungus spreads to healthy plants near by, by means of the spores (seeds of the fungus), and before the grower knows it his entire field may be badly infected.

APPEARANCE ON THE LEAVES.—From these spots on the stem and seed-leaves of the seedlings the spores find their way to the large leaves and branches of the rapidly growing plants. The leaves are attacked along the veins causing them to darken, and later frequently are eaten thru and killed. This causes a lessening in the starch production of the plant and effectively reduces the yield of seed. Many times, the attack is so severe that the leaf stems are cut off and the entire plant is ruined.

EFFECT ON THE PODS.—It is from the attack of the disease on the pod, however, that the most direct and apparent damage to the crop results. The tender tissue of the growing pods, containing plenty of water and food material, offer the best conditions for the growth and development of the parasite. Spores from the spots on the leaves and stem fall onto the pods, where in the presence of moisture and summer temperature they germinate, and penetrate the tender skin of the pod. In here they branch and grow rapidly producing in time the dark brown or rusty spots which enlarge and form the anthracnose canker. The dead tissue dries and settles, causing a pit or sunken place in the pod, in the center of which spot the spores of the fungus are produced in great abundance. The spores ooze out and pile up forming pink masses easily seen with the naked eye. At first they are held together by a glue like substance which easily dissolves in rain or dew and at any disturbance of the bean plant these spores are scattered in the drops of water onto the healthy plants nearby.

The spores of anthracnose are scattered only when they are wet and this explains why beans should not be cultivated or handled at any time when the foliage is damp, and it also explains why a warm rainy season is so favorable to the development of the disease. This was well illustrated by the experience of the past season, for it was during the warm muggy days of early June that the first serious outbreak occurred. Much infected seed was planted last year and as the seedlings came up, weather conditions were excellent for the spread of both anthracnose and blight. Garden beans were very generally infected and both diseases were very destructive until the appearance of hot dry weather when they were somewhat checked.

Later in the season, in August, weather conditions again became favorable and at this time the pods were very badly affected as well as much of the seed itself.

EFFECT ON THE SEED.—As the threads of the fungus penetrate deeper into the pod they finally reach the seed within. Now unless the seed is entirely destroyed by the fungus, it ripens and encloses some of these threads of the fungus which remain dormant. Quite often the presence of the fungus is shown by a brown or yellow discoloration of the seed coat, or the seed may be pitted and more or less shriveled. Such infected seed is fairly easy to remove, and unless removed the fungus is awakened to life when the diseased seed is planted in the spring.

CONTROL MEASURES.—Soaking infected seed in formalin and other poisons such as copper sulphate solutions has been much tried, but as yet no very satisfactory results have been obtained. Any poison which kills the disease also injures the bean. Moreover, the beans are not conveniently handled in a planter when wet. On the whole seed treatment cannot be recommended.

SELECTION OF CLEAN SEED is of first importance in growing a clean crop. All beans to be planted should be most carefully "hand-picked" and all beans showing discolorations, wrinkles, pits or blisters should be discarded. It is well to repeat the handpicking to be sure all diseased beans are removed. This cannot be too carefully done as it is the first out step in the control of anthracnose.

As soon as the bean plants are well thru the ground, they should be carefully examined and diseased seedlings pulled up, carried from the field and burned or deeply buried. This is the second step in the combat with anthracnose and it is very important as some seeds show no indications of the dormant fungus.

SPRAYING.—If the field shows any considerable amount of diseased seedlings, it will probably be necessary next to spray the field with bordeaux. Do this as the first two leaves begin to unfold and spray every two to three weeks thereafter. The best formula to use is five pounds copper sulphate and five pounds of stone lime to 50 gallons of water (same as used for potatoes). Spraying, however, has not been found to be practical on large fields because of the cost; and it can be recommended for use only where one is attempting to produce clean seed or seed for a market that recognizes the value of clean seed. Be sure, though, to thoroughly cover the whole plant with the spray. Some special attachments to the sprayer may be necessary to do this well.

The time put into spraying would probably much better be used in removing all diseased plants from the field and carefully burning them.

Last but by no means least never cultivate or touch the beans when they are wet unless absolutely necessary. If the spores are present even in very small numbers one disturbance of this nature may spread the disease over the whole field. Repeated cropping of the same land with beans is not desirable as it may result in infecting otherwise clean fields. Resistant varieties are not reliable and too much dependence cannot be placed on them. The ordinary seedman does not pay any particular attention to clean seed and he picks up what appears to him to be satisfactory seed. Even the best seed houses have sent out seed beans of the garden wax varieties which are at times very badly infected with the anthracnose. Infected beans should be removed by careful sorting and used in other ways than for planting.

IMPORTANCE OF CLEAN SEED.—It is very important that clean seed be produced, especially in our own state. Vermont seems particularly well adapted to the production of beans for seed to be used in other states, especially those states somewhat farther south. Seed produced in our state is much better than that produced in parts of New York state and on the irrigated fields in the West. Government authorities have recognized this fact and this past season they stationed in Vermont a specialist on bean diseases to assist as far as possible in producing clean seed. The work was begun rather late and the results were not as complete as they might have been, but they showed us more fully the need of producing, and of using only clean seed.

Professor A. H. Gilbert of the U. S. Department of Agriculture who had charge of this work confined his survey of the bean disease problem largely to Grand Isle County as that is the most intensive bean growing section of the state. The main purpose of the survey was to learn to what extent the bean crop, especially pea beans, was free from anthracnose. It is not possible to pick out all infected seed from a diseased crop after threshing, and clean seed can be secured only from a crop that has been inspected before harvesting and found to be free from disease. Among all the growers of pea beans only forty-five were listed as having grown beans that showed no anthracnose at harvest time. The report of this work showed further that of 1151 acres of pea beans grown in Grand Isle County only 300 acres or 26% were found to be free from anthracnose. This is in itself a serious condition as undoubtedly some of the

diseased seed will be used next year, and if weather conditions are again favorable even greater losses may occur.

Professor M. F. Barrus of Cornell University at Ithaca, New York has been working recently on this problem of producing clean seed and he gives the following rules as being sufficient, if carefully followed, to produce a crop of clean seed:—

1. The grower must secure as clean and disease-free seed as possible.

2. Carefully hand-pick it in order to remove any spotted, discolored, shrunk, broken, undersized or otherwise poor seed.

3. Test the germination of the selected seed.

4. Plant it in hills an equal distance apart each way, 30 to 36 inches, using as nearly as possible four seeds to a hill. The spread of spraying machine wheels may determine to some extent the distance apart of rows.

5. If other beans are to be grown on this or adjoining farms, locate the experimental field at a distance of at least 40 rods from such other beans.

6. Locate the field on land suitable for growing beans and apply to the soil the amount and kind of fertilizers customary with good bean culture.

7. Spray the beans with home-made bordeaux 5-5-50, beginning at the time they are well up and making applications about every 10 to 14 days unless otherwise directed. Commercial mixtures must not be used.

8. Remove from the field any plant affected with anthracnose when seen, using care not to allow it to come into contact with other plants.

9. Avoid going into the field or permitting others to go for any purpose whatsoever, when the vines are wet with dew or rain.

10. Avoid going directly into the experimental field from another bean field for the purpose of hoeing, cultivating, or for any other purpose.

11. Harvest these beans, store and thresh them separately from other beans in order that they will not become mixed with them even to the slightest extent. If a neighborhood threshing machine is used it will be necessary to take especial care that other beans left in the machine are removed before threshing beans from the experimental field.

DRY ROOT ROT.—This disease is caused by a fungous parasite known as *Fusarium*, and it is sometimes spoken of as *Fusarium* root rot. It is now one of the most common bean diseases in western New York and was very serious

in Vermont last summer. The disease is not generally recognized as its most striking symptoms are below ground.

The dry root rot may be observed first a week or two after the bean plant is above ground. It appears as a bright red to a dull orange coloration on the tap root, at times as red streaks along the stem just beneath the ground. As the disease progresses the lower portion of the tap root and the lower side roots become brown and dry. Above the dead area new side roots are produced which during the latter part of the season are all that remains of the root system. Thus the plant is not supplied with sufficient food and water to produce pods, and in severe cases the entire root system is killed.

The disease is not manifested above ground during the early growing period. There is only a slight dwarfing of affected plants which may be observed only in comparison with healthy ones. The symptoms of the disease are very evident at podding time when there is a very apparent checking in the growth of the plant. Few pods mature, the remainder fail to set, or drop in the early stages of formation. The diseased plants mature earlier than the healthy ones and their leaves turn yellow and fall. In many cases the seeds are small.

CONTROL.—As this fungus is a soil-inhabiting organism and may live for many years in a field in the absence of host plants, no satisfactory control methods have been developed. When an infected field is again planted to the crop, the organism very early infects the roots and invades the parts of the bean plant under ground. It does not produce spores to any extent on the living plant. The following precautions, however, should be observed in dealing with the dry root rot of beans:—

1. For planting use land that is free from the parasite. Land which has never or seldom grown beans is satisfactory.

2. Do not apply manure which contains bean straw to a field which is free from the parasite.

3. Deep cultivation injures the surface roots, which on diseased plants are the only roots supplying food and water. Shallow cultivation is recommended.

4. Where short rotations are followed the disease appears to be more severe. Long rotations, however, do not eliminate the disease.

BEAN RUST.—The *true rust* of beans, like the anthracnose, is a fungus disease. It differs from it, however, in many respects. The chief difference being that it is much less common and destructive. Rust occurs largely on the

foliage of the bean but the spots are much smaller than anthracnose spots, being about the size of a pin head. It rarely occurs on the pods and the stems and never on the roots. Except in very severe cases it does not materially injure the leaves, only sending its growing threads into the leaf for food and moisture. The beans themselves are never injured by the rust fungus. Spores are produced in large numbers and they are of two kinds—the summer and winter spores. It is by means of the winter spores on the leaves that the disease lives over from year to year. In the spring these spores will attack the bean plants providing that beans are planted on the infected field or on an adjacent field a second season.

While rust is uncommon and rarely destructive it is undesirable to let it become established on a farm. Therefore it is well to learn to know it, so as to be able to remove the plants showing any rust and to burn or otherwise destroy them. When beans are sprayed for anthracnose this disease will also be controlled.

BEAN BLIGHT.—Bean blight is a bacterial disease. The tiny bacteria find in the bean plant suitable conditions for their life, and they grow and reproduce very rapidly in all varieties of the garden and field beans. Like the anthracnose, blight attacks all parts of the bean above the ground but is most conspicuous on the foliage and pods.

The first evidence of the blight is usually observed in the leaves. It starts in the leaves as irregular, water-soaked areas usually bordered by distinct yellow lines. These increase until the entire leaflet may be diseased. Later as the leaf dries the watery spots become brown and brittle. On badly blighted fields the leaves become dry and curled as if they were scorched. The bacteria are thought to gain entrance into the bean plant through a wound, usually the result of insect attack; and having gotten in they gradually travel down the stem to other leaves and to the pods. This movement is rather slow and it may be checked altogether by hot dry weather; but often the plant becomes clogged with the bacteria, the water supply is shut off, and the plant wilts and dies.

The blight bacteria often find access to the pods which, if young, may shrivel and die. In the larger pods they produce spreading watery spots which finally become amber-colored with uneven green centers, but never sunken and black as in the case of anthracnose. From the pod the disease readily gains entrance to the growing seeds and when these are ripe they may be yellowish, spotted, shriveled or perhaps show no effect at all. The bacteria, how-

ever, having gained entrance to the seed remain there dormant through the winter. With the germination of the seed in the spring the bacteria also begin to multiply and find their way to healthy beans and so the infection spreads.

BEAN BLIGHT CONTROL.—No practical method of seed treatment has been devised to prevent blight. The hand picking of seed in the case of blight is very questionable, owing to the fact that blight infected seeds are often not discolored and it is impossible to sort them from the healthy ones. The only safe method is to use seed that was grown in fields free from blight. Rotation of crops will prevent serious trouble from diseased tops left on the bean fields. Spraying with bordeaux has been tried now for several years, and while it prevents to some extent losses from the blight it cannot be said to fully control the disease. The only safe recommendation for control is to get as clean seed as possible.

BEAN WEEVIL.—The injury caused by the bean weevil is done both while the beans are in the field and after they are threshed and put into storage. The mature weevils are small, dark colored beetles which lay their eggs upon or inserted through slits in the bean pods hanging on the vines in the field. The eggs hatch out into small, white, footless grubs which bore into and feed inside the beans. These grubs transform to brown-gray weevils inside the bean and are found as such later when the beans are inspected in storage. The weevils finally emerge from the beans as full grown dark-colored beetles which again lay eggs on the outside of the shelled beans. These eggs develop into the white grubs and another life cycle is started which may last from 21 to 80 days depending on the season and locality. The weevils are so serious a pest in the South that they prevent the raising of field beans.

CONTROL OF WEEVILS.—"Weevilly" seed should never be planted as but a small percent germinate and those have low vitality. The remedies are of use only as applied to insects in the stored seed. Treat infected seed as soon as possible by fumigation with carbon bisulfide. This is a sure remedy and is not expensive. Use one pound of carbon bisulfide to every one hundred bushels of seed, or one ounce to every one hundred pounds. Put the seed into a tight bin, box or barrel with a tightly fitting cover. Then place the carbon bisulfide on top of the beans in an open dish, cover the box quickly and securely being careful not to breathe the fumes and leave for forty-eight hours. Then uncover and air the beans thoroughly, putting them where

they will not later become infected. Keep all light away from the box where the treatment is going on as the gas is highly inflammable.

In closing, the importance of having each grower raise disease-free seed for his own use must be emphasized. If it is not possible to plant the main bean field under satisfactory conditions to prevent disease, a small seed plot from one-half to one acre should be planted apart from the main field. Only disease-free seed should be used on this plot and it should be cared for according to the methods which have been given above and which are approved by the U. S. Department of Agriculture. If any grower does not have disease-free seed and cannot procure it the Vermont Extension Service will inform him where he can obtain such seed.

Some seed houses are willing to pay higher prices for disease-free seed and if it can be produced in Vermont it is readily saleable. If anyone is suitably located so that the bean crop will ripen well and has land adapted to bean raising it ought to pay him to look into the seed bean proposition quite thoroughly. Bean raising requires considerable labor and if the labor situation is acute one should not go into it very extensively. Beans have been a profitable crop in the past when prices were much lower, and with proper care used in producing the crop there seems to be no reason why it should not be profitable in the future.

PRINCIPLES OF VEGETABLE STORAGE.

A. P. BEACH, AGRICULTURAL EXTENSION SERVICE,
UNIVERSITY OF VERMONT.

Having produced an abundance of such vegetables, as carrots, cabbages, turnips, beets, squashes, onions and celery, during the summer months, the question arises as to how these crops can be stored so that their use may be extended over the greater part of the winter months. Proper storage of these valuable foods will help greatly in the conservation of our food supplies. There is an abundance of vegetables to be put into storage this fall and the free use of these foods this winter replacing meat more or less will tend to promote health and aid the cause for which we are all striving. It is a comparatively easy matter to put vegetables into the cellar and have them keep for a month or two, but to keep them in good shape for six months or more is another matter.

OBJECT OF STORAGE.—The object of storage is to preserve perishable products in their natural state for as long a period as possible. From a commercial standpoint, the object of storage is to insure a uniform market supply throughout the season at stable prices and to avoid over supply and depressed prices on one hand and scarcity and high prices on the other. From the standpoint of home food supply, a quantity of winter vegetables is indispensable in these times.

INFLUENCE OF GROWTH ON KEEPING QUALITIES.—In order that storage may be successful it is necessary that vegetables be in good condition. We cannot secure good results from poor material. Storage does not improve it simply seeks, more or less successfully, what diplomats refer to as its "status quo ante." It is generally known that immature vegetables will not keep well. As an example, squashes that are not well hardened seldom keep for any length of time. Cabbages under most conditions must be firm and solid. On the other hand root crops grown overlong become hard and stringy. This is why it is usually advisable to make separate plantings for crops to be used in the summer and early fall and for those to be used in winter, selecting varieties accordingly.

INFLUENCE OF STORAGE ON QUALITY.—In putting vegetables into storage, care should be taken to sort out all specimens showing bruises, cracks or disease symptoms which if put into storage not only will decay but may cause the loss of the whole crop. Careful handling especially of such crops as squashes is also important for the reason that bruised specimens are very susceptible to early decay.

Having placed vegetables in storage the first consideration is temperature. Most vegetables should be held between 33 and 40 degrees Fahrenheit altho cabbages and celery will stand a temperature of 30 and squashes keep best at about 50. The temperature should vary as little as possible. The next consideration is the control of moisture. Some vegetables if kept in a moist place will wilt rapidly while others sprout and rot. Temperature and moisture requirements vary greatly with different classes of vegetables and failure is sure to result from attempting to store different kinds under the same conditions. Moisture and temperature can be controlled largely by proper ventilation.

AVAILABLE STORAGE PLACES.—The house cellar is almost universally used as a storage place for all kinds of food products. Its accessibility is its chief asset but it possesses decided disadvantages. Such vegetables as cab-

bagged, onions, and turnips stored in quantity give off unpleasant odors and if they begin to rot the cellar becomes unsanitary. Temperature and moisture conditions are not readily controlled especially if furnace heat is used. A dry warm cellar injures the quality of most vegetables and spoils others.

If the cellar is large enough conditions may be improved by partitioning off a section. If there is a cellar under an ell of the house, this part will generally be found best adapted for a vegetable room. A good tight partition should be built, either of concrete or double boards. A tight fitting door and ample means of ventilation are also necessary. A window on either side will be sufficient but too much light would be injurious in some cases, as, for instance, with potatoes..

VENTILATION.—A regular ventilating system consisting of a cold air inlet extending from one of the windows down to the floor, is desirable, as it permits cold air to enter at the bottom of the room. A stove pipe with damper might serve this purpose. A light of glass may be removed from the other window and a small hinged door fitted in its place, which when opened, allows heated air to escape. In cold weather both inlet and outlet should be closed. By using these methods of ventilation there is little difficulty in keeping the room at the right temperature during most of the storage period. A dirt floor, while not as clean as concrete, is sometimes better as it will provide a certain amount of moisture in the room; a slat floor is suggested to keep the barrels out of the dirt.

During severe Vermont winters it is not always a question of keeping vegetables cool enough but rather to keep them from freezing during severely cold spells. With this point in mind it would be well in the construction of bins to place them a few inches from the outside wall. A blanket or old carpet spread over the bin will often ward off a freeze. A lantern placed on the cellar floor will keep the air circulating and the temperature from going too low. It is much better to be safe than sorry when zero weather prevails.

PACKING MEDIA.—Root crops can be kept in good condition for home use by packing in sand or sawdust. This treatment tends to keep them from becoming corky and fibrous.

INDIVIDUAL REQUIREMENTS.—Cabbages require rather moist conditions as well as low temperature. For this reason they do not keep very well in the house cellar, tending to wilt and lose weight. If they are hung in paper bags

or packed in sand they will keep fairly well. Methods of storing cabbages in out of door pits will be considered later.

ONIONS.—The storage of onions is seldom given proper attention. They must be kept in a cool dry place. Moisture and high temperatures are sure to result in sprouting. They will sprout in a damp cellar even if the temperature is near the freezing point. They will usually keep well if stored in crates having slat sides since good ventilation and aeration are thus secured. It is often stated that if onions are allowed to freeze and are kept frozen their quality will not be injured. This has been tried with onion sets without affecting their subsequent growth and development.

CELERY.—May be stored in small quantities by placing it in boxes with enough moist sand in the bottom to cover the roots. The roots should be kept moist, but care must be taken not to wet the stalks. Temperature may run very low with celery. A little frost in the cellar will not injure it. Out-of-door storage will be considered later.

SQUASH AND PUMPKINS.—These are unlike other vegetables in their requirements. One should not attempt to keep them in an ordinary cellar for the reason that they require somewhat higher temperatures than other vegetables, as well as a dry and well ventilated place. A shelf is a good place for them but in no case should they be piled on top of each other. The stems should be left on. Furthermore they keep longer if the stems are dipped in paraffin. Immature or badly bruised squashes spoil rapidly. It is well to let them harden and cure out of doors before placing them in storage.

Some ten years ago experiments with the storage of Hubbard squash were carried on at the Vermont Experiment Station. A ton of squash was put into storage October 3rd and held at temperatures ranging from 50 to 60° for about 4½ months. The weight and decay losses aggregated 1¼ of the crop, but the stored material sold at a higher price, the gain amounting to \$33 per ton. This shows that storage of squashes can be made profitable.

POTATOES.—These are important this year. When the crop is plentiful little attention is paid to storage methods and great losses occur following the careless storage of wet tubers in warm and poorly ventilated cellars. When placed in heaps or bins opportunity is offered for the development of any disease with which they may be infected, also favorable conditions are offered for rotting. Small bins are best and these should be so built as to give circulation between the wall and the bin as well as between

the floor and the bin. The temperature should be lowered as quickly as possible after placing the crop in the cellar. This may be accomplished by opening doors, ventilators and windows on cold nights and closing them in the morning. The proper storage temperature for potatoes is supposed to range from 34° to 38°. High temperatures cause shrinking and sprouting which is particularly injurious to seed stock. If good ventilation can be secured there should be no trouble in keeping temperatures low enough.

Potatoes are often brought from the field and left in bags in the cellar. This is a bad practice, for if the potatoes are slightly damp the bags will prevent their drying out and rotting will follow. The fusarium rots are the chief cause of losses resulting from improper storage conditions. Buried ones are much more susceptible to injury than the sound tubers. These rots do not develop to any extent at temperatures ranging from 35° to 40° F. Various methods of treating potatoes to prevent rot such as liming or treatment with formaldehyde, etc. have been tried but none would seem practical for general use. The benefit derived from the use of lime seems to be chiefly moisture absorption, however, if applied directly to the wounded tuber it tends to lessen the rot.

SEPARATE CELLARS.—Those who grow vegetable crops in fairly large quantities surely will find it a profitable investment to provide a separate vegetable cellar. There is usually a scarcity of vegetables in the early spring time and those that have been properly stored command high prices. Vegetable storage cellars are made in a variety of forms to meet different requirements. The first consideration is to select a sheltered place with good drainage. A side hill or knoll offers naturally advantageous conditions. The excavation can be so arranged that only one wall will be exposed; and the less exposure there is during a severe winter the better. Concrete is excellently adapted for use in side walls and roof. A concrete vegetable cellar is indestructible and pays for itself many times over in preventing valuable food from going to waste. If apples or other fruit are to be stored in the cellar, separate compartments for vegetables and apples should be constructed.

A recent issue of one of our farm papers describes a vegetable cellar which was built under the driveway leading to the large barn floor. This cellar was entirely underground and opened into the stable, thus making it easy to enter regardless of outside weather conditions. This method of construction seems very practical and could be

used in connection with any side hill barn. Crops could be put into storage easily thru a trap door in the roof. Special means of ventilation must be provided, such as cement flues or tiles that can be closed at will.

PIT STORAGE.—The method of storing vegetables in pits or excavations, while used successfully in some localities, does not seem particularly well adapted to Vermont conditions. It is an easy matter to put on enough layers of earth and straw to prevent freezing, but it is much more difficult to keep out the rain and melting snow. Moisture, collecting in the pit, causes rot during the warm spells, and tends to induce freezing when a cold snap comes. Furthermore rats and mice, which are found in most localities, delight in locating a pile of crisp fresh vegetables. Cabbage and celery are often stored in pits to advantage. Cabbage which are not fully matured, if transplanted into trenches and covered with layers of straw and soil will often harden up during the winter and be in good condition for spring use. Celery, if packed tightly in narrow trenches, will bleach thoroughly and keep in a good crisp condition. Old hot beds or cold frames are often used to store these vegetables. It is well to provide some board covering to exclude rain and snow.

Salsify and parsnips are usually left over winter where grown. They are not injured by freezing and seem to improve in quality. A better way is to dig them very late in the fall, pile the roots in a heap and cover them with soil or straw. When thus placed they can be obtained more easily and much earlier in the spring than if left in the ground.

SUMMARY.—Thus in making a summary of the recommendations for storing vegetables I wish to call particular attention to the following points. First, the use of varieties of vegetables best adapted to storage. Certain varieties of cabbage, beets, turnips, celery, etc. keep better in storage than others. Second, the proper care in grading and handling products put into storage. Third, the regulation of temperature, moisture and ventilation to meet the conditions necessary for each crop: Cool moist condition for cabbage, root crops, celery: Warm dry storage for squash, pumpkins: Cold and dry condition for onions and potatoes.

To provide these conditions calls for improvements in the average house cellar. The partitioning off of a separate vegetable room and the installation of a ventilating system, or the construction of a separate vegetable cellar placed under ground and equipped with a ventilating system. In order to guard against frost in vegetable cellars, build the

storage bins away from the outside walls. Place blankets over the bins and hang lantern in the room when zero weather approaches.

Some vegetables can be stored in out of door pits successfully. However it is hardly practical for an amateur and some covering must be provided that will exclude rain.

All persons who grow vegetables and this will include nearly everyone, should consider the question of vegetable storage to be of sufficient importance to justify special efforts to improve general storage conditions. It will make a vast difference with the food supplies on hand next spring if every family exercise proper care in the storage of vegetables now on hand. Every pound of perishable food that is allowed to deteriorate or go to waste means that some other form of food will be required to take its place.

Thus the question of vegetable storage resolves itself into one of strict household economy and patriotic duty. Each one of us can do his bit even if it consists merely in giving vegetables the proper kind of storage.

The following publications will make instructive readings:—

Purdue University, Lafayette, Ind., Bulletin No. 58.
The Storage of Vegetables.

U. S. Department of Agriculture, Washington, D. C.
Farmers' Bulletins:

- No. 879, Home Storage of Vegetables;
- No. 847, Potato Storage and Storage Houses;
- No. 354, Onion Culture;
- No. 282, Celery;
- No. 433, Cabbage;

No. 852, Management of Common Storage for Apples
in Pacific North West.

Vermont Experiment Station, Burlington, Vt., No. 186,
Farm Apple Storage.

Wisconsin, Extension, Madison, Wis. Circular No. 92.

Storage of Vegetables, Wellington, Vt. Hort. Soc.
Rept. 1909.

MINIMIZING DEER INJURY.

HON. LINUS LEAVENS, CAMBRIDGE, VT.

In approaching the subject under consideration, I assume that the farmers and landowners, or the farmers as landowners, are interested to maintain this great breeding herd of native deer, the annual income from which as a contribution to our meat supply, amounts to a large sum; and I assume that the sportsmen are equally bound to consider the rights of the landowners who maintain this herd.

Let me remind you first, that the Commissioner is not responsible for the existing laws. They are such as have been passed by the representatives of the State of Vermont. The Commissioner is not able to change them; he is responsible for the execution of the duties which they impose upon him. So far as the Commissioner has to do with the question of injury to crops, fruit trees, or shrubbery by deer, and in his instructions to county wardens as to the policy of the department in regard to same, he has approached the subject without prejudice and in the spirit of fairness to all concerned.

Section 9 of the Fish and Game laws gives to the landowners, or tenants, or members of the family, or persons authorized by them, the right to kill deer damaging crops, and provides a method whereby they may retain possession of the carcass of the animal so killed. Under this provision, since July 1, 1916, until the present time, 107 deer have been killed in Vermont, 76 of these in Windham County; 9 in Rutland; 8 in Windsor; and the other 14 in Addison, Bennington, Essex and Washington Counties.

In Windham County, where deer are most troublesome, and in other counties when the Commissioner has been appealed to, the most liberal interpretation possible of this provision has been made, and recommended to wardens. Certificates have been granted where injury has been done to crops, whether or not the deer were killed while actually doing damage. I believe the provision that the report of the landowner or tenant, be made within 6 hours should be changed to 12 hours instead. With such amendment, this provision of the law seems to me wise, and if liberally interpreted, will materially minimize the damage done to farm and garden crops, and orchards of limited area.

The General Assembly of 1917 passed a budget bill for the support of the government, making no provision for the payment of damage done to crops by deer under section 8 of the Fish and Game Laws. The contingent fund under the provisions of the budget law can only be used for such purposes as are specified in class "A" of the bill. The Commissioner has approved the payment of these claims from the funds of the Fish and Game Department, as such a bill passed the House of 1917 unanimously, and after being held by the Senate Committee was reported adversely and killed in the closing days of the session, more through lack of interest, than of real opposition. I believe these claims should be paid from the funds of this department, and that it tends to bring the department and the landowner into closer relations, and I shall so recommend to the General Assembly of 1919.

The total amount of claims paid from July 1, 1916 up to the present time amounts to \$2,436.13, or nearly as much as was paid in the entire biennial period preceding.

Of this amount \$1,370.23 has been paid to claimants as follows: In Windham County \$300; Windsor, \$306.00; Rutland, \$272.40; Bennington, \$173.50; Addison, \$130.00. The balance is made up from Essex, Orange, Orleans and Washington; while in Caledonia, Chittenden, Franklin, Grand Isle and Lamoille Counties no claims have been presented.

The reason for the largest number of claims presented in the southern tier of counties, namely, Windham, Windsor, Rutland and Bennington, is not only that deer are more numerous there, but in this section are situated the largest commercial orchards, and in connection with these claims, the largest amount of damages have been allowed.

The provisions of Sec. 8, for the payment of claims for deer injury are probably as satisfactory as any that could be adopted. I am of the opinion, however, that a very large number of persons having claims which might properly be presented, do not avail themselves of their privileges under this law. They seem to prefer to suffer the loss themselves. No system of reimbursement for damage done to growing crops or trees, will ever be entirely satisfactory. Most men prefer the satisfaction of growing their crops and reaping their harvests, but claims should be presented and injury minimized, so far as a remedy is provided.

So far as has come to the Commissioner's notice, there has been no failure on the part of the selectman and the county warden to agree as to the amount of damages on

claims presented. In one instance, in Windham county, the county warden asked the Commissioner for an expert on estimating the value of a growing crop of alfalfa.

Senator Dunklee of Vernon was asked in this instance to act with the selectman and county warden.

By far the most serious problem connected with this question of injury is the damage to young orchards where men have planted large areas and invested thousands of dollars in the preparation of the land; drainage, fertilization, etc., expecting no return until the trees have reached the bearing age. These men do not want injury minimized; they want it eliminated, if possible. Any damages awarded would be inadequate, as trees killed, or nipped so that growth is retarded, or made unshapely, is a loss not only of the trees, but of the initial work as well. I refer to orchard enterprises like that of the MacRae Orchard at Castleton; the Connecticut Valley Orchard Company at Westminster; the Buxton orchard at Middletown Springs, and others of this class. So far as I have talked with these men, they are fair and broad-minded in their ideas. I have given much consideration and have come to approve, the idea of Mr. R. R. MacRae of the Bonnie Braes Orchard Farm at Castleton; namely, an open-zone-season of one mile on all sides of a commercial orchard of a certain fixed number of acres or more. This would at first mean considerable slaughter, but I believe the end would justify the means, and would not only settle this problem of deer injury, but would encourage the further planting of commercial orchards on a large scale, and make productive, lands that will be used for no other purpose.

I wish to quote Mr. E. W. Nelson, Chief of the U. S. Bureau of Biological Survey.

"The time has now arrived when the State Game Commission should unite and co-operate with the State Agricultural Colleges and the State Extension Service for the purpose of having the Game, Fur and Fish Resources of the State properly represented in the agricultural college courses, for the purpose of educating the farmers as to the tremendous value of game and furs as an agricultural output, and to get and build up a spirit of co-operation. At the same time to increase the game supply of the State, whereby not only the sportsmen but the farmers themselves will reap a direct return."

I believe there was never a time in the history of the State when all departments of the State Government were working so heartily in cooperation as at the present time. I am under obligation to all these department heads

for valuable assistance rendered to me in my work, and I wish at this time to express myself as ready not only to co-operate with these departments, but with all State Associations like your own, that we may stand and work together for such methods, and such legislation as will serve the best interests of all the people of the State.

THE HOME MANUFACTURE OF FRUIT BY-PRODUCTS.

PROF. W. W. CHENOWETH, MASSACHUSETTS AGRICULTURAL COLLEGE.

Competition and the increasing scarcity of materials long ago forced the great manufacturing industries to adopt the rigid policy of eliminating all possible waste. So thoroughly is this practised that to-day many concerns find their chief profit in what was formerly a waste product. Large business concerns are seeking through every possible means to bring up the efficiency of their business through the conservation of time and energy.

The last type of business to adopt such a policy and to make its application widespread is that of agriculture. It is only within comparatively recent years that the more progressive of this class of men have attempted to organize their business along lines of economy and efficiency. A short visit to an average New England farm will convince the observant inquirer that there remains much to be done before this class of producers are showing 100% efficiency.

The great call that has come to the nation because of the world war is bound to result in great good to this class of people. The scarcity of food—the high prices of all farm products will result in greater economy than has ever been thought possible. Not that the farmer is a wanton waster, but that he has never felt the need for real economy. Many reforms which have had only an outcrop here and there will be so thoroughly accelerated as to produce far reaching results and will establish new standards. Economies which have only been practised by a few will come to be the common practice and all for the bettering of general conditions.

Among no class will these reforms and economies play a more important part than that of the fruit growers, whether it be those whose primary business is fruit growing or those who indulge in it as a mere side line to some other phase of farming.

The growing and marketing of fruits is always attended with more or less loss of products. This must of necessity result under the common methods of growing and handling because of the nature of the products. Fruit is a perishable thing and must be used when ripe, otherwise loss results. Because of the ravages of insects and diseases and because of weather conditions and methods of handling there is always, a percent, varying of course with seasons and growers, which cannot, because of its quality be marketed. And this must be counted in as a loss. In years of large crops when markets are flooded and products move slowly the losses in the more perishable fruits reach enormous figures. Insufficient knowledge of markets and lack of proper distribution add further to the losses so that if it were possible to gather up all the losses that occur in the fruit-growing business in New England alone a tremendous saving would result. And while it may not be possible to avert all these losses much of it can be and will be prevented in the near future. And this is one of the reforms that has been slowly but surely working its way among the fruit men of the East and the strenuous times of the present are bound to set it forward many years.

Just as the manufacturer has learned to convert his piles of waste materials into profit-making by-products, so the fruit grower of the near future is going to set about converting his culls, his surplus and over-ripe fruits into by-products which will result in gains instead of losses and which will eventually wipe out the mortgage on his farm.

In support of this statement I want to give you a few illustrations.

Two years ago I visited a section of the small fruits district in the Hudson Valley. The season had been rainy and very warm and the fruit was of course very soft and juicy, and consequently spoiled readily. The growers of this particular section were suffering severe losses because hundreds of their crates of raspberries were condemned by the New York city inspectors and were ordered to be dumped. Many other cases brought less than the cost of harvesting.

Most of this fruit, perhaps all of it, could have been saved if the growers had been equipped for manufacturing these soft overripe berries into their by-products. In so doing they would not only have covered their own losses, but would have also retrieved the glutton condition of the market to just that extent.

One grower, in commenting on the low prices, said that the women of the cities preferred their leisure or the "movies" to standing over a hot stove making currant jelly and raspberry jam. Then in the winter these same women buy from the stores cheap imitations of what they used to make in their own kitchens.

It seems to me it was this man's job to convert his large crop of cheap fruits into high grade jellies and jams in order to meet the demands of the city women who prefer leisure afternoons to hot ones over the kitchen range. He could have made these products from his raw materials more cheaply and with greater comfort and when he came to sell his products in the autumn he would have realized more for his crop while the city woman would have had the pleasure and satisfaction of eating home made jellies and jams not of her own making, and as a result everyone connected with the transaction would have been happier.

Now contrast the conditions in this section with those of one of the largest small fruits growers of Vermont whom I visited the following week. The owner of this farm does not permit any of his fruit to waste. Down near a little brook is a small one room building, housing some simple equipment which is used as a by-products factory. When fruit is soft or not in good condition to carry to market or when the prices drop below a profit making price his fruit goes to this little factory and is there made into a variety of fruit products which later are marketed in a near-by college town at prices which give a good profit because his goods are known to be wholesome and of high quality. And I venture the assertion that the present and succeeding generations of college girls in that town will rise up and call this man blessed.

All the work in the factory is carried on by a competent woman supervisor and one or two girls, and when they are not needed here they may be found among the harvesters or in the packing shed. No high salaried foreman, no complicated nor expensive machinery to get out of order, no expensive building, yet a very efficient thing is this cheaply constructed house with its simple equipment, since it is capable of eliminating all the waste from a 15 acre small fruits farm.

What this New England pioneer has done can be done by hundreds of other eastern fruit growers, and there need be no anxiety regarding the disposal of high or even good grade products. Such products have the stamp of "home made" and possess a market value considerably above the commercial factory product.

The little woman in this state when she first started her business of making fruit products in her kitchen, worried considerably the first year for fear she would not sell all the products she had made. She feared that her investment in one hundred pounds of sugar might prove a failure, but after being in the business nine years and using that year 10 tons of sugar she had no fears of having any left over. That seems a fair answer to the oft asked question, can I sell these products after I make them?

The college towns alone in New England will consume tons of fruit by-products if they were to be had and if the quality is right. While the automobile trade would carry away other tons to their city homes.

Not all the opportunities lie with the small fruits. Peaches, plums and grapes offer just as great possibilities as do the small fruits. Butters, jams, jellies and preserves will readily care for all excess or poor fruit and these will add largely to our food supply.

The apple crop for the country for the year 1916 as given by the Department of Agriculture, was 67,415,000 barrels. The Bureau of Markets estimated that 10% of this crop was used in making cider while 15% was a loss or was fed to live stock. Our research experts have found that apples are worth about 10c per bushel for stock feed, when hay and corn are selling at normal prices. Not a very profitable way to dispose of apples. Particularly is this true since Lindsay has shown that apple pomace alone is worth about 4c per bushel of apples for feeding dairy cows. This leaves a feeding value of only 6c for the four gallons of cider contained in the bushel of apples.

Did you ever really think of the potential value of a bushel of fairly good cull apples? We have found in our work at the college, working along home manufacturing lines, that we can produce from such a bushel of apples any one of the following:—

- 4 gallons of cider.
- 4 gallons of cider vinegar
- 7 pounds cider jelly.
- 3 quarts boiled cider.
- 2 quarts apple or cider syrup.
- 2-3 gallon apple butter.
- 4-6 pounds of dried apples.
- 30-40 pounds of apple jelly, depending upon the amount of sugar used.

In addition to this the pomace from a bushel of apples will make about 20 lbs. of jelly if six to eight pounds of sugar are used. Or the pomace may be used as a base for making various fruit compounds, not of highest quality perhaps, but wholesome and palatable.

Also the peelings and cores from a bushel of apples used for canning or drying will make 2-3 to $\frac{3}{4}$ as much much jelly as will the whole fruit and with a little care this could well all be first class jelly. Is it not worth while then to think of the tremendous possibilities that lay in those 28,800,000 bushels of the 1916 crop and that lie in the annual crop of $2\frac{1}{2}$ million bushels of New England cider apples?

All of the products are easily within the realm of home manufacturing and as a means of saving a large part of our fruit crop which now is practically a total loss is surely worthy the attention of many of our fruit men.

The most valued apple products viewed from the standpoint of the home are perhaps dried apples, apple jelly, apple butter and vinegar.

The farmer in one of the hill towns of western Massachusetts who ordered a \$6.00 cook stove dryer from a mail order house and then spent the cool autumn evenings around his kitchen stove drying his cull apples which he later sold for $12\frac{1}{2}$ c per pound, realizing about 75c per bushel for apples such as he had allowed to rot in the orchard in previous years, would doubtless advocate drying as a means of avoiding loss.

Apple butter is without doubt the best manufactured product of the apple and yet it is practically unknown here. A few men here and there over the state who had the right notion about this product could develop a market which in a few years would take care of thousands of bushels of our poor grade apples. Our college towns as a rule contain enough people from sections of the country where this product is known and prized who already have the appetite developed to give an entering wedge for the enterprise. And once begun the business would most surely prosper.

Cider vinegar is another product which is greatly neglected. No other kind of vinegar will replace good cider vinegar for general household and manufacturing purposes. In comparison to the amount used in New England we manufacture very little. Inquire the source of supply of any large hotel or retail store and you will be convinced that we are permitting our sister states to supply the bulk of this product. And that is true despite the fact that we produce enough poor grade apples annually to make about

10,000,000 gallons if we would but utilize them in this way. Vinegar is not a difficult thing to make. It simply requires doing the right thing at the right time and this anyone can learn in a very short time if he but sets himself to the task.

Cider jelly is another product which might well receive the attention of some of our growers, especially those who have a supply of cheap fuel.

My grocer at home sells several dozen 5-pound buckets of this jelly every winter in our little village of 150 families. A New Hampshire pioneer supplies him with it. And yet there is a cider mill within a half mile of the store. This cider mill nor any of its patrons do not supply my grocer with cider vinegar, he buys it through a jobbing house. My grocer does not sell apple butter. I doubt very much if he knows what it is. Some enterprising grower could easily secure this grocer's business in cider jelly and vinegar and might easily build up a good trade in apple butter.

The other apple products, boiled cider, dried apples and apple jelly are all standard New England products and could with a little effort on the part of the grower be made the channels through which his low grade and excess fruit could be brought to the consumer as wholesome palatable foods. It will do more than this. Once the grower establishes a market for his products he will be tempted to extend his plantings because he now has a safe and sure market for all the fruit he can grow. As a result many an unproductive acre of New England land will become a productive acre and the consuming public will be supplied with more home grown, home made fruit products which after all are just a little better than anyone's else. And I believe the time will soon be here when many of our fruit farms, especially the small and medium sized ones will have as a part of their equipment a small by-products factory, or else an interest in a larger co-operative one, and through this factory all excess fruit and all unmarketable fruit will eventually be offered to you and me in the form of most delightful by-products.

These products should always be sold on the special market. They should not be placed in direct competition with those from the commercial factory.

HANDLING THE APPLE FROM TREE TO CONSUMER.

BY WM. H. WOLFF, ASSOC. PROF. OF HORTICULTURE,
NEW HAMPSHIRE COLLEGE, DURHAM, N. H.

I need scarcely tell you that I am enjoying my visit with you. I have enjoyed helping judge your fine fruit display and have been intensely interested in listening to the discussions. As you know I am from a neighboring state similar in nearly all horticultural respects to Vermont and so you have asked me to come here to talk over with you some of the ideas and methods we are using in handling our fruit in New Hampshire.

First, let me say that our main work in New England I believe to be, not so much to produce apples as luxuries, as to produce and market economically good moderate priced apples for the millions of people in ordinary circumstances. Everything points to this as our logical work, as for instance the fact that we are now doing this, and that we grew into it naturally, we have low priced orchard lands, relatively quick and cheap transportation to excellent markets, and that we are able to sell not only the best but practically all grades of fruit at a profit. We have not made any mistake in developing our trade in barrelled apples in the past and it only remains for us to study this problem more in detail, to devise better methods of production and to reduce the cost as low as possible by better system.

I do not mean that we should not aim at producing fancy box apples but the bulk of our Baldwins, R. I. Greenings and similar fruits will continue for many years to go into barrels,—and they ought to. The Pacific North-West can ship to our markets nothing but the finest quality fruit and if you wish to compete with them here in New England in this fancy box trade you can do it, a few are gradually learning to, and we may eventually make the competition so keen as to almost drive the Northwest fruit from our markets, but that day is a long way off. I need only remind you that the production of this fancy box fruit calls for the utmost care in culture, spraying, thinning, grading and packing. Ninety percent of our growers are not prepared to give this care, hence will not produce the quality required for box trade. It will not pay as a rule to try to produce box and barrel apples on the same tree; to pick the boxing

grade from your barrel stock will only reduce the quality of the latter, and to put anything but the smoothest finest colored stock into standard boxes will only bring disappointment in the returns.

WHERE SHALL THE PACKING BE DONE?—The first technical question which we would ask ourselves having completed the production of the crop so that it hangs ripe on the tree is, where shall the packing be done? Shall it be in the orchard or in the packing house or shed under cover? Our own experience, and that of the most successful orchardists we are acquainted with, has led us to be convinced that packing in the orchard should be the exception rather than the rule. Packing under cover has many advantages, for instance, we do not have to divide our labor force and so can leave the apples on the trees till the latest safe date thus securing the highest color and then with all hands picking get through quickly. We can give this large force our personal supervision every minute, and they usually need it to prevent fruit spurs being broken off, stems pulled out and unnecessary rough handling. Again with the apples stored under cover on a rainy day or wet morning we can use part at least of the help on the work of sorting and packing.

PICKING RECEPTACLES.—In regard to picking receptacles, smooth surface, half bushel swing handle baskets are preferred by us to any other receptacle. We have discarded long ago picking bags of the many types that were advertised. At times when pickers have been inclined to be careless we have given them iron pails, thus affording a means to catch the fellow who is throwing the fruit about.

LADDERS.—Much time and energy is wasted in the orchard by having ladders unsuited to the work. We find the men will not move the heavy ladders as often as is necessary and will tire themselves by carrying ladders. Since the main object is to pick as much fruit as possible, ladder carrying being only incidental, we believe that ladder weight should be reduced to a minimum. We have made it a practice for several years at the New Hampshire College to buy and use only the best special light orchard ladders obtainable, preferring pointed ladders always to the ordinary two rail one.

RECEPTACLES FOR FRUIT AS PICKED.—The question will arise, "What shall we put the apples into as they are picked from the tree?" Many growers are using the Boston vegetable gardeners' bushel box with cleats on two sides so that when filled they can be stacked up without bruising the fruit, others are using new barrels for this. In case new

barrels are used it will be necessary to exercise care that they do not become unduly soiled, and the heads when taken out should be nailed together for convenience and kept in a dry place to prevent them from swelling. If this is not done much loss of time and trouble will ensue when we come to fit them back into the barrels.

DON'T CARRY FULL BASKETS FAR.—In case the packing has to be done in the orchard there are a few important things we have to look out for, the first is to see that the grading outfit, either sorting table or mechanical grader, is placed convenient to the trees. We believe it is best to locate the packing outfit between three rows to be picked, and to pick the six trees on each side of the table in these three rows. When these twelve trees are finished we move to the next group. With trees forty feet apart no picker then is required to carry his full basket more than eighty feet from the ladder base. We must learn to save for the actual work in hand.

RACKING PLANKS.—In this orchard packing too we need to be sure to provide heavy racking planks. Have these not less than 2" thick and 12 to 14" wide. We like to use separate planks for the A and B grades and perhaps a third for the fancy grade. This will help prevent mistakes in marking after the barrels are packed.

The use of sizing machines is becoming more popular, and rightly so. We have had some experience with the Parker, the Pease and the Hardie graders and have found them satisfactory. A sizing machine will allow one to do better sizing, more accurate sizing and quicker work than can be done by the old hand method. A sizing machine will even appear to increase the quantity of fruit you have, in other words, by putting all the large apples together the fruit will pack out more bushels than if you mixed small and large apples together; this is because there will be more air spaces between the fruits. Machine sized fruit will allow of more attractive packing, since the fruit will run more uniform in size. A customer can be easily satisfied and pleased with a barrel of $2\frac{1}{2}$ or even $2\frac{1}{4}$ apples, but if we mix in some 3 or $3\frac{1}{4}$ inch with these he thinks he is being cheated. The use of sizing machines will allow of easy compliance with state and national laws now requiring the marking of the minimum size on the package.

COOPERATIVE PACKING IN NEW ENGLAND.—Cooperative packing allows of many advantages. But there is not much of it, comparatively speaking, in New England. The best example is that of Oxford Bears Association of

Buckfield, Maine. This was organized some few years ago by seven Conant brothers,—quite a team to start with,—and they have now taken in outsiders until they have at the present time 34 members, all located in the adjoining towns of Buckfield, Hebron and Strong. Last year they sold \$30,000 worth of apples and the business of the past six years has amounted, as the secretary told me a few weeks ago, to \$100,000. They do not allow the members to pack their own fruit, but the association hires expert packers and sends them to the different farms and then has an inspector visit these farms at irregular intervals while the work is in progress. They have developed an enormous demand for their product due to this care and system in packing and have no trouble in getting a price usually a good deal in advance of the market.

Good grading, uniform sizing by the use of machines and thorough racking of barrels are the three chief factors in putting up quality packs, which will in their turn help develop business.

PACKAGES.—The great bulk of New Hampshire apples are at the present time packed in barrels, and without doubt, as I have said before, this will be the standard package for our leading varieties for many years. It is an axiom in selling that the appearance of the package helps sales, and this is as true in regard to apples as to other commodities. The best fruit should go into new clean packages and often a better price is thus secured, but even if no extra price is received it may still pay by making sales come easier and quicker. Second hand barrels are often advocated and used, but usually they are no cheaper in the long run than new barrels when we figure the extra labor of cleaning them thoroughly, and extra time necessary in fitting heads.

Iron hooped barrels have during the last few years made an appearance and great claims are made for them. One of the larger growers in New Hampshire reports using over 2,500 of these barrels for each of the years 1915, 1916 and 1917 and in talking with him the other day I find he is very enthusiastic over the package. He states that no nailing is done, no hoops are broken, no liners are used, and that there is scarcely ever a package but that arrives at destination after a railroad trip of eighty miles with heads in perfect condition. Incidentally, he mentioned the fact that he eliminates the cost of 300 to 400 pounds of nails each season and the labor in driving each nail. I have talked iron hooped barrels to Boston commission men and while some of them take to the package I find others

who say they dislike them because they claim the iron hooped barrels do not stack well or evenly on the bilge. The grower I refer to says they stack well enough for all practical purposes.

Many of our growers are packing more and more fruit in the standard boxes each year, and this practice is bound to increase as we learn to more nearly approach perfection in our product. The standard box is undoubtedly the best package for the finest quality fruit and nothing but this should be placed in it. Another box used a great deal today by growers near the larger eastern Massachusetts markets is the Boston market gardeners' box. Fruit is packed in this with the first layer only faced and the rest simply poured in and shaken down. We find a great deal of fruit on the Boston market today is sent in in these packages and it is even used for the storage of a small proportion of the Massachusetts and southern New Hampshire crop. This package costs about the same as the standard apple box, but there is a rebate of eight cents allowed by commission men for the market gardeners' box, making a net cost of about ten cents. This package exposes a large show face, does not result in much bruising and can be packed quickly and by ordinary farm help without special training.

For early fruit I do not believe we can do better than to encourage the use of baskets such as the flat market basket with the handle or the half bushel Jersey peach basket. These make very fine, showy, economical retail packages.

STENCILING AND MARKING.—The New England Fruit Grading laws,—now almost uniform,—require five special marks on closed packages. Other marks, these laws declare may be used provided they are not inconsistent with or more conspicuous than the required marks. This clause "more conspicuous than" I hold is not necessary, fair or reasonable since it tends to reduce all labeling to a dead level, may prevent the use of valuable trade marks and brands and does not permit of the use of originality in advertising. We believe that if this were consistently enforced it would actually result in reduced sales owing to poorer advertising. We believe it will always pay growers to have some unique and good trademark. The trademark of the Oxford Bears Association, of Maine, which I have already referred to, is one of their most valuable assets. Buyers look for this mark and inquire for it. The Western growers are using the blue and red seal for their best grade of boxed fruit and a red seal for their second

grade. These marks are something the public will easily remember and expects to find the second time after it has seen it once. The late J. H. Hale's famous red label was one of the best trade marks ever gotten out in this country and worth a great deal of money to the owner.

We believe it is a good plan not only to have a good unique trade mark on the outside of the package, but that it is also advisable to place a pamphlet or some little advertising matter inside the package as for example the name of the variety, the particular uses for which the variety is adapted, your personal guarantee of the contents, some interesting facts about your orchard and the fact that if in the future your fruit cannot be obtained from the same dealer it may be had direct from the orchard. This is often a means of building up a fine retail trade.

DISPOSAL OF PACKED FRUIT.—Get the fruit into cold storage quickly. One of the most important things for orchardists to bear in mind is the effects of high temperature on fruit in the fall just after it is packed. Fruit should be put into cold storage or at least cool storage within a day or two after it comes from the trees and the quicker the better. Mr. G. Harold Powell, formerly of the U. S. Department of Agriculture, has shown that allowing Baldwins and Greenings to remain in the orchard a few days in warm fall weather after being picked has shortened their keeping qualities as much as two months.

In general, winter fruit should be stored near where it is to be sold. If we are expecting to sell in the large city, it should, in my opinion, be stored in that city, because we cannot ship by freight from the home storage in very cold weather without taking special means to warm cars and keep them warm, and because we cannot take advantage of quick market fluctuations.

Cellar storage for local trade or retail trade is excellent and if possible should be provided on the farm. A cellar should be mostly below ground with a room above for barrels and tools. Some means for cooling the storage rooms in the early fall and summer should be provided and I know of nothing better for this than the simple and easily operated Madison Cooper Gravity Brine system. A convenient location for such a cellar storage is on the east or south side of a slope; this will allow us to drive into the basement or storage proper and also on to the floor of the building above.

SELLING THE FRUIT.—Selling the fruit is the one problem where the average grower finds himself more or less at a loss as to just what is best to do and neither can I

today tell you, or do I believe anyone can tell you, what is best to do under the many circumstances and conditions which confront the growers. This fall much fruit was disposed of by our orchardists in New Hampshire, and I feel sure by your growers in Vermont, to buyers who bought in some instances all fruit A and B grades at \$3.50 to \$4.00 per barrel, f. o. b. cars. It appears that growers who sold early made well this year, at least such are now the indications of the market. Commission houses are able to sell and to dispose of great quantities of fruit. I find that the best success comes where the grower ships to the same firm year after year usually resulting in the house learning to take a personal interest in the orchardist and his fruit.

The auction market as a means of selling fruit has been almost entirely neglected by the New England orchardist. While it is not our purpose to advertise any particular business it is entirely proper to say that the fruit auction market business of Boston is carried on only by one firm, H. Harris & Co., who have been conducting this same business for sixty years, or since 1847. The extent of this business may be judged from the fact that this year they have handled approximately 7,000 carloads of fruit. The auction market sales rooms are located at Charlestown (Boston, Mass.) just across the bridge from the North Station. Sales begin at nine every weekday morning excepting Saturdays and holidays. It is worth any fruit grower's time to visit this fruit auction and to stay there long enough to appreciate the vast amount of business carried on with speed and system under an exterior of apparent commotion and excitement artificially created by the auctioneer with the purpose of forcing buyers to give him and the business at hand their undivided attention.

Usually from 20 to 50 cars of fruit are received every night and sold the next day. These cars are unloaded at night by the auction company and the fruit is stacked in the warehouse and a certain proportion of packages of each mark or brand is opened. From daylight on each lot in the warehouse is opened to inspection by prospective buyers who usually are willing to depend on the sample packages selected at random and opened by the action company, but they may open as many more packages as they like, provided these are repacked and left as before.

At the fruit auction the grower is protected in every way and his goods usually bring the highest prices consistent with their real value. As for instance if one ships 50 to 100 barrels to the auction market, the fruit is offered

in small lots of 10, 20 or 25 barrels. If by any chance only one bid should be made and this a low bid the person or his agent could withdraw the fruit from sale. If two bids were made the sale of this first lot would have to be made, but if the price were considered too low the owner or his agent could withdraw the other lots till a later time or altogether, if he chooses to do so.

The charges by the auction market are for carload lots 3% commission; for small lots 4% commission, trucking charge of 8 cents for barrels and 4 cents for boxes, also a labor charge of 4 cents for barrels and 2 cents for boxes, and a terminal charge of 1 cent for each package. In addition to this it is necessary for the owner to be by an agent at the auction. There are men who make a business of looking after growers' interests at the fruit auction for a small charge usually not more than one or two percent.

The fruit auction offers many and decided advantages to the seller of fruit. It brings together in competition at one time and place all classes of buyers and one may on any day at the fruit auction recognize commission men, wholesale grocers, buyers for chain stores; buyers for hotels, for large restaurants, fruit storemen, fruit peddlers and pushcart men.

The large fruit growing sections selling through co-operative exchanges are using the auction market system almost exclusively, believing it presents the most direct route to the consumer and that through it they can get the highest net price obtainable. Some of the fruits largely marketed through the auction market system in the big cities of the country are—the oranges, lemons; grapes, apricots and plums of California; the oranges and grapefruit of Florida; the apples of Washington, Oregon, Colorado, and Idaho. Prior to the war a large proportion of imported figs, dates, grapes and citrus fruits were also handled in this way.

There are many New England fruit growers who prior to the past year or two have shipped their fruit to England for many years and this has always been sold on the auction market there with good results. The day has come when the New England grower may well afford to take time to investigate for himself the American auction market as a means of disposing of his fruit.

Selling fruit direct to fruit stores and the better class of grocers is another means which can often be used to advantage. Where this is done it will often be a good thing to try to interest the store manager particularly in your fruit by having him visit the orchard once or twice a

season. Direct selling to grocers and fruit stores is practiced by at least one of New Hampshire's largest growers, Mr. A. I. Hall, of Rochester, who packs usually 2,000 to 3,000 barrels each fall, placing these at once in the Quincy Cold Storage warehouses and making deliveries in Boston and vicinity directly from there. He is his own salesman and by putting up a superior uniform product he can secure a price usually in advance of market quotations.

LOCAL MARKET.—Your home town and home city markets are not half taken care of by you. During the past two days since I have been in your city of Burlington I have been looking into the stores and windows to find a good display of Vermont apples, but the only kind I have succeeded in finding is B grade or worse—poor and scabby. If you were going to have a banquet in Burlington tonight and wanted to set at each place an apple of quality equal to such an occasion the only fruit you could find in this city, outside this show, is Oregon or Washington grown. An interpretation of this fact is that the Oregon people feel it is worth while to send their fruit 3,000 miles and to always keep it before the Burlington public, and you do not, who is right? I believe one of the functions of our State Horticultural Societies is to develop markets for fruit. Your state and ours appropriate moneys for us to go to Boston and Springfield, Mass., to make displays—what for? To advertise and to make markets for our fruit and this is a good thing to do, it pays, but it has always seemed to me that when our State Societies have a chance to advertise at little cost their products in a big Vermont or New Hampshire city we ought also to do this; only a very small proportion of the buying public of Burlington will see this wonderful display of fruit in this hall. If you have plenty of stuff at home similar to that in the boxes and barrels here shown the very best thing you could do with this entire box and barrel exhibit would be to make a more or less permanent bulk display of it in the best store and best show window you could find in this city. If done right surprising sales would surely follow. But I am afraid you do not now have the fruit—you are too much like us—you have shipped it to Boston to New York and other big cities while Burlington goes begging for a good apple or gets it from Oregon.

Speaking of developing local markets I am reminded of one of our New Hampshire orchardists located about eight miles from the city of Nashua. About six years ago this man bought his farm on which there are large orchards with a fair proportion of early fruit. As soon as he had

obtained possession friends in the neighborhood went to considerable trouble to make plain to him that the Baldwins and Greening trees of the orchard were good property and would always produce paying crops, but that the early fruit as Red Astrachan, Yellow Transparent, Duchess and so forth were of no account and ought to be cut down or top worked. They said such fruit cannot be sold to advantage. This man had the consumer's viewpoint pretty well developed and believed that it would not take much persuasion to make the average person eat as many apples in August and September as later if only they could be placed before them right. He found the only effort to sell this fruit had been a few usually under-ripe or over-ripe little lots taken into the city on the wagon Saturday nights when the former owner made his week end visits to town. Our orchardist changed all this, he bought a Ford truck and sent a load of early apples to Nashua every day while they were in season. He says he can't get enough to supply the local trade, which he has almost to himself, and that the prices are so good that the early varieties pay better than the later winter fruits. This in Nashua which we would not expect to prove a particularly good retail market and by a farm located eight miles distant. But what is eight miles for a Ford?

In conclusion I would urge that we must learn to more fully appreciate the standpoint of the consumer. As fruit growers it will not do for us ever to feel that when we have sold the fruit, "gotten rid of it", to use a common expression, it is all up to the other fellow and our interest ceases. Big modern business is not done in this way. Producers in other lines are careful to see that their products finally reach the consumer in excellent condition; and then it pleases customers. We too must follow these lines; we must so grade, pack and handle every package of fruit that it will perfectly satisfy the ultimate consumer and make the selling path easier for packages that are to follow. I believe our New England orchardists can never spend a few dollars to better advantage than to visit once in a while the big city markets, to see their own fruit and other people's fruit as it arrives, to get acquainted with the dealers and people who know the consuming public and learn their viewpoint. We may then return home, to produce more nearly what is wanted, packed in the way that will make the best appeal, and be in a better position to make a larger profit on the business.

ROUND TABLE DISCUSSION OF SMALL FRUITS.**NEW VARIETIES.**

By GEORGE D. AIKEN, PUTNEY.

Among the newer varieties of berries we find the Erskine Park, Minnesota No. 4 and Empire raspberries. Erskine Park was found in a field of Marlboro in Massachusetts, and is a fall cropping variety. The berries are about the size of and resemble in flavor the Herbert, and the cane is about the most vigorous I have ever seen,—not long and vinous like Cuthbert, but stocky and strong. The summer crop is late, about the same season as Cuthbert, but the fall crop comes on earlier and it is much more productive than St. Regis. The one fault of Erskine Park is a serious one, for it does not seem to be self-pollinizing. This year I shall try to see if St. Regis planted nearby will induce more perfect fruiting. If it does St. Regis is destined to become a pollinizer only.

Minnesota No. 4 was sent out by the Minnesota Horticultural Society, and I have now fruited it. The plant somewhat resembles Perfection, but the resemblance ends here as the Minnesota No. 4 berry is good to eat and the seeds are practically unnoticeable. It is an extremely promising variety.

The Empire was introduced in the fall of 1916 by Wardwell and Velie of the Hudson valley. I have not yet fruited it, but am told that the berries are as large as Syracuse and that it is as good a plant maker as St. Regis.

Among the strawberries Mr. Cooper's Peerless and Ideal have received the most attention. So far as I can see these are both identical with Superb for practical purposes.

Speaking of synonyms I might give you a few. I do not say that these varieties are actually identical as the one is generally the parent of the other, but for practical purposes they are synonymous—

Marlboro—Ruby, Idaho—Eaton, Hyde—Rochester, raspberries.

New York—Uncle Jim—Rychman—strawberries.

Some useless varieties of blackberries: Robinson, McDonald, Wilson, Wilson, Jr., Rathbun, Erie, Macatawa, Black Diamond, and its synonyms.

These are mostly good varieties in their place, but that is decidedly not Vermont, although some may do well if protected through the winter.

GOOSEBERRY MILDEW.—The gooseberry is the most neglected of the small fruits. From it can be made jelly, conserve, jam and spiced gooseberry, all equal or superior to similar products made from currants, and in addition the yield per acre is about double that of currants.

There is but one serious difficulty in growing gooseberries, and that is the mildew. Mildew in its various forms often defoliates the plant, causes the berries to spot and drop and stops wood growth. Fortunately this disease can be controlled.

Last year, in conjunction with Dr. Stevens of the U. S. Department of Agriculture, I carried on experiments to find the most satisfactory method of controlling gooseberry mildew. Three methods were tried out, and the following was found to be most successful.

Before the leaves start in the spring the bushes and surrounding rubbish, where the spores of the disease might winter, are sprayed with lime sulphur at the ratio of 1 to 10. After the leaves start, but before the blossoms open, a second spraying with 1-20 strength of lime sulphur is made. After the blossoms fall and just as the green berries become noticeable a third spraying with 1-30 lime sulphur is made. At this time add a little arsenate of lead and the currant worm is eliminated for the season.

In badly infected areas, a fourth spraying at the 1-30 rate may be advisable. This lime sulphur method is generally successful and much more efficient and safer than the old potassium sulphide which is also likely to burn the leaves.

THE SUMMER BOARDER GARDEN.

GEORGE W. PERRY, SOUTH HERO.

I presume to speak with authority on this subject because for fifty years I have personally worked in the garden with ungloved hands, and also for eighteen years I have conducted a summer boarding place that has been numerically and financially very successful. We have 80 or 90 guests, and there are 20 of us taking care of them. We raise nearly all of the fruit and vegetables placed upon the tables, having

about five acres under cultivation, and requiring the services of two or three men besides myself. In what I have to say as to times of planting and harvesting the different products, it must be remembered that land on the island of Grand Isle is the very best, and that the season is much longer than anywhere else in New England.

IMPORTANCE OF THE GARDEN.—In the problem of making a success of the summer boarding business there are four important factors. First the natural location, that is the grounds, the water, the sky, the scenery, all the attractions that Nature herself provides. Next comes the equipment, which includes the buildings and their furnishings, and whatever is arranged for the entertainment and pleasure of the guests on the grounds. More important still is the personality of the host and hostess, their attractiveness, their tact in handling people, their fidelity to their duties in providing for their guests and looking after their interests night and day. But of still greater importance than any of these is the garden, because, if that is fine, the city folks will excuse some deficiency in the other things. It is easy to get summer boarders, and to keep them too, even if the location is not ideal, if the equipment isn't as good as it ought to be, if the latest and best things are not provided for their entertainment out of doors, if the furnishings of the buildings are not up to date, and if the host and hostess are not so very attractive and interesting, provided there is set before them three times a day a table covered with all that Nature will produce, and spread before them in the greatest profusion. They will say in the parlance of the city, "I like the eats in that place," and they will come the next year.

THE GARDEN IN GENERAL.—Since the garden is so important, the man who starts out to keep summer boarders must carefully consider what kind of a garden *summer boarders would like*. He must not plan on planting a garden growing only the things that he himself likes, or that he thinks that other people *ought to like*, but he must rather consider wholly what fruits and vegetables his *guests will like*. Suppose the man who opens a shoe store should stock up with only the sort of shoes that he thinks are sensible, should decide not to sell those with twostory heels and kneehigh tops, should decide to keep on sale only the goods which he himself thinks the people ought to buy and wear. He might keep shoes for sale, but he certainly would not sell many, and he would surely soon go out of business. It would be just as foolish for the man making a garden for summer boarders to decide to plant only those things that

he thinks they ought to eat and which are sufficient for himself. He must learn first of all that city people, though they have to buy them in the market, eat three times as many vegetables as do the farmers, who may have them growing right at the kitchen door. Also they eat three or four times as many sorts. The farmer, after he has put in his main crops, plows and harrows a spot for a garden, and then leaves it mostly to the women to plant and care for. They put in a row or two of peas, a little sweet corn, a little lettuce, a few beets, beans and cabbages, and perhaps cucumbers, tomatoes and squashes. But they make but one planting of anything for the whole season. When the things of this planting have passed by, then they say the season is over for such things. The maker of the summer boarder garden must make up his mind to plant every sort of fruit and vegetable, that will grow in his section, that may ordinarily be found in the city markets, and he must plan to have these things come onto the table at the earliest possible moment, and must plant them repeatedly so they may continue to the end of the summer season. He must have garden room enough to plant them in the greatest profusion, and he must put them on the table with the most generous lavishness. He will be lucky if he can get his guests to adopt as a slogan of his place, "M. I. K., More in the kitchen", so that no one will fear that he may be cutting some one off from his rightful share, if he eats a good deal more than is generally the case.

THE SOIL AND FERTILIZERS.—Though of course the best soil should be selected, as the best in none too good, yet almost any kind of soil, except heavy clay, will make a garden. For, if it is too wet, it can be drained; and if it is too dry or sandy, it can be watered and heavily fertilized. The gardener must use the best he has and do the best he can with it, mixing brains, constant care and a love of the work, with it. If he can get a great quantity of stable manure, that is the best possible fertilizer for the garden, but he cannot succeed with a limited quantity of it. The market gardener, if he can buy it, will cover his truck land all over a depth of at least three inches with stable manure, and plow it in, putting on 60 double box loads to the acre. For some crops he will put on double that quantity. But it is possible to make as fine a garden as even grew without this valuable product from the barns, provided that the things used in place of it are put on the soil in sufficient quantities. Commercial fertilizer, ground bone, wood ashes, and nitrate of soda, combined in different ways for different

crops, will make almost any fruit or vegetable flourish, though of course some roughage must be plowed into the land for humus.

THE VEGETABLES IN THE ORDER OF THEIR IMPORTANCE.

POTATOES.—The first in importance is the potato, this all the year round vegetable being eaten by all classes of people in this part of the world at least once a day. Every effort should be made to get the tubers for the table as early in the summer as possible. Sometimes a few days may be gained by a special act in planting. When the furrows have been made, let the sun shine into them and warm the soil for two or three days before putting in the seed. The new potatoes should be ready for the table by the middle of July, and may sometimes be had much earlier. They can be put on the table, either baked or boiled, when not larger than an egg, and the boarders will eat a lot of them. Enough should be raised to carry the crowd over till new ones come again next year.

LETTUCE.—The second in importance is lettuce. In the city, even with people of moderate means, this is on the table all through the year. It is so easy to raise, and grows so abundantly and rapidly, it ought to be upon the table of the summer boarding place for dinner every day of the season from June 15 to Oct. 1, and, in addition, frequently for supper in the various salads. It is the salad plant par excellence of the whole civilized world. Plants secured from a greenhouse in Philadelphia may be had as early as April 12. These can at once be set out, under cheese cloth screens, in the open ground. The screens will remain on only two or three weeks. By the middle of June these plants will make hard heads that will delight the first guests. A week later there will be fine heads from seed sown in the garden under cheese cloth by April 12, provided the right variety is planted. The young plants must be kept thinned out so they will not touch each other till about two inches high, when they must be thinned to 8 inches apart in the row. Those taken out can be transplanted to other plots of ground, standing 8 inches apart in 12 inch rows. If the seed is good, every plant will make a solid head. Enough should be raised so that all the outside leaves may be thrown away. It should be gathered early in the morning, and cleaned and put into ice water at least half an hour before dinner time. The boarders will be

perfectly delighted with it, and will inquire about the variety and the manner of its growth. There is nothing cheaper on which to feed them.

PEAS.—Green peas are third on the list. If planted by April 12, they may be usually had by June 25, and sometimes much earlier. When the first ones come on the table, served in cream, and the people get a taste of them, there will be exclamations of delight all over the dining room, for they don't taste much like the embalmed ones they have eaten all winter. Neither will they be satisfied with a tablespoonful served in a little dish, though that is always enough of the canned sort, but they will like to have a great dishful, with a spoon in it, set down before them, with the privilege of helping themselves. Nowadays, even in summer time, at the best hotels even in Vermont, even in Burlington, the canned sort is served to the guests. It is well to put in three varieties at the first planting, and, if the right sorts are selected, they will come along just a week apart, each one of them serving the table one week. They should be planted in a trench six inches wide and three inches deep, one quart of seed to a hundred feet, and should be covered only an inch deep, the rest of the dirt being hoed in when they are three or four inches high. As soon as these are up another planting should be made of the latest sort, and this process repeated till July 1, when a return should be made to the earlier kind, as it does better in July and August, because of the smaller foliage. They should be served for dinner every day for two weeks, and then every other day till August 1, and then occasionally till Oct. 1. When the September guests find them on the table they will exclaim with delight, having always reckoned them as a spring or summer vegetable. When the guests have filled up with green peas they will not eat much roast beef.

GREEN CORN.—The fourth on the list is green corn, which would contend with peas for the third place if it had as long a season. But it is impossible to grow it much earlier than Aug. 1. It is well to plant some one of the early white varieties for the first week, but, after that, nothing but the Golden Bantam should be served, being planted every two weeks up to July 10. It should be on the table every day as long as there is a boarder on the grounds, having been gathered just long enough beforehand to get it cleaned and cooked, and not cooked too much either. An ear of corn that costs half a cent will take the place of a slice of meat that costs ten cents.

BEANS.—The fifth is beans. This vegetable grows in more shapes and sorts, and is put on the table in more ways than any other one. It ranks all the way from the lowly and humble string bean up to the lordly and aristocratic pole lima with its giant pods. It even breaks into the flower garden, the scarlet runner being one of the prized garden ornaments of our New England foremothers. There has been a great improvement in beans during the last fifty years. Still, the seedsmen list and sell, because they are called for, the sorts that were the best to be had fifty years ago. At that time the "long yellow" was the only string bean known, and though tough and stringy it is yet found in every catalogue in the land. The first great improvement was the wax podded sorts, and they for a time held the field. With the advent of the stringless green pod that variety in turn took the lead. In the shell beans there has been no such advance, as the horticultural still holds the leading place. Later there are the delicious limas, which can be grown in this section, if the right sort is planted, being ready for the table the latter part of August. The September people will appreciate the delicious beans, well cooked and served with cream. String beans should be planted about May 1, and may be ready soon after the Fourth of July. Successive plantings should furnish them throughout the season. Special pains must be taken in planting the limas. The soil must be made soft and fine, and then each bean stuck in by hand with the eye down. For all kinds of beans ground bone is the very best fertilizer.

BEETS.—The sixth in importance is the beet, in which there has been a marvelous improvement during the past 15 years, so that now there are several very delicious kinds. The seed should be sown as early as the ground can be worked, under cheese cloth if possible. The surplus plants taken out in thinning may easily be transplanted. When the roots are half an inch in diameter they will grow much faster, if the soil is drawn away from the tops of them. By the middle of June they appear on the table as beet greens, and in a few days roots as large as eggs will be ready. Successive plantings should be made up to July 1, and there should be enough raised so that they may always be used while small, being always very welcome upon the table, if thoroughly cooked.

ONIONS.—The seventh vegetable is the onion. Let no one think for a minute the city people will not eat this odorous vegetable while on their vacations, simply because

they do not while at home, while engaged in society events. Chicken or turkey does not seem just proper for dinner without the company of this strongminded bulb. If onion sets are put out just as soon as the land can be worked, it is possible to get bulbs large enough to boil by the middle of June or earlier. The onion maggot must be looked out for, which is easily done by drawing away the soil from the bulb as soon as it is well established.

MISCELLANY.—There are next several vegetables of about equal importance, the cabbage, tomato, squash, turnip, carrot, cucumber and radish. Greenhouse cabbage plants set out early in April will make fine heads early in July. For the latter part of the season seed should be sown in the open ground. Tomato plants should not be set before the last week of May, and the fruit will seldom be ripe before August 1. This is a vegetable when boiled and served for dinner, but a fruit when sliced for supper. The squash seldom arrives before the first of August. The little old summer crookneck is far superior to all other early squashes. The Hubbard may be had for the September guests, and will be enjoyed. Early turnips planted by April 12 will be ready to serve by June 25. But, unless protected by cheese cloth screens, the little plants will be devoured before they get fairly out of the ground. Better sorts should be planted for the later parts of the season. Cucumbers, even under cheese cloth, cannot be planted before the first of May, and in the open ground not before the first of June. If they are picked in the morning before the sun shines on them, and sliced into ice water an hour before serving, to take out the gum, they will hurt no one. Farmers are apt to think of carrots as a sort of horse food. But the table sorts sliced up with cream, or with the New England boiled dinner, are very much liked. If the seed is sown early in April, they may be gathered early in July. Radishes occupy a very insignificant place, but some people are very fond of the pungent roots. There must be frequent sowings as they are good only a week. A goodly quantity of slaked lime raked into the seed bed will usually prevent the ravages of the little white maggot.

Next there come calling for recognition some humble things that many people would have put much earlier on the list. The city people are fond of greens. When the dandelions get to be three or four inches across, the farmer's wife spends a long hour digging a mess, and then is another hour preparing them for the table, and the folks eat them and pretend they like them. She may do this two or three times, and then the season for greens is over for

the summer. But the city people want them all the summer through. They are fond of beet greens, they love spinach, and they just dote on Swiss chard. There has been lately introduced a new plant called New Zealand spinach, which, however, is not a spinach at all. Any one wishing the seed will need to apply for it early, and he must not plant it till the soil is warm. Both this and the chard take but little room, as they can be cut down constantly, and they will constantly grow up again.

ASPARAGUS.—The next to be mentioned is asparagus, which the summer boarder never expects to find on the table. But it pays to provide this delightful food for the early comers, and have it every day for dinner, cut up and served in cream like green peas, while the larger stalks can be served on toast for supper. It will be impossible to give them too much of it. When the peas arrive then its day is done for the summer. It is very easily raised and a small bed will supply a large family.

Lastly should be mentioned the cauliflower, what has been called the college-bred cabbage, though it seldom comes along in season to be of much service in the summer boarder garden.

THE LEFT OVERS.—It is the practice in most summer boarding places not to serve anything of which there is not enough for the whole party. So the help get for their supper, in addition to the regular bill of fare, all the left overs, and so really they are fed better than the boarders. It is a very good plan to put on the tables such things as peas and string beans that were left at dinner, and let those among the guests who wish them help themselves. The corn that is left works in very finely for supper in that good old Indian dish, succotash, which also uses up the shell beans. The beets are good pickled, but are more useful, together with the carrots, in giving color and character to what the country people call "red flannel hash", that is served up the next morning after a boiled dinner. Then there are the salads. Every one of the vegetables left over from dinner can be made into some kind of a salad by a successful cook, and take the place of the expensive cold meat generally served for supper. The city people are fond of salads. In the summer boarding house the salad platter should be the garbage pail for the left over vegetables.

SMALL FRUITS ALSO IMPORTANT.—Is rhubarb a fruit? We make sauce and pies of it, and so will have to reckon it a fruit. It is a very important plant to have abundantly

in the garden for use the first of the season. Alone it makes a fine pie, but makes a delicious one mixed with strawberries.

Strawberries are due about the middle of June, and their coming is one of the events of the summer. People often wish "that they could have garden berries with the flavor of the wild ones". There are many kinds that may be grown in the garden that are far ahead of any wild ones, if they are allowed to get ripe. They should be raised abundantly, so they may be put on the tables in great glass dishes, each with a spoon in it, and the people themselves allowed to judge the quantity they need, and it will be a quantity surprisingly large. They will go well for dinner also in the good old New England shortcake, two or three stories high.

There should be the same abundance of the different kinds of raspberries, which may be served in the same ways as the strawberries. Currants interfere with the drinking of milk, and so are not very useful, but they should be grown to a small extent. Gooseberries are enjoyable eaten out of hand direct from the bushes, and they do make good pies. Blackberries go well on the table and make fine pies. All of these fruits should have a place in the summer boarder garden, and should be grown plentifully enough so the guests may have the privilege of helping themselves.

The children will begin to eat the apples before they are half grown, and when they really are getting ripe and the new apple pies and apple sauce appear there is a marked sensation in the house. Hot apple sauce will be a going dish for many a day.

When the plums and grapes arrive it will not be necessary to put them on the table. If the host is wise, he will point out the way, or give the word, and there will be a procession going out and coming in all day long. There is nothing that delights the city dwellers so much as the privilege of knocking off an apple or picking a plum which they think looks nice. If it does not prove so, why then they can try their luck again. The grapes will not be able to hide away from them under the leaves.

NOVELTIES.—It is a good plan to grow in the summer boarder garden, not only those things which the guests may reasonably expect to find there, but also some novelties to surprise them. The kohlrabi is a German vegetable, but is not to be blamed for that. This cross between the cabbage and the turnip is more delicate than either, and when sliced and creamed certainly will go once in a while. There is a pea that the seedsmen call the sugar pea, but which the

people are apt to call a string pea, because it is eaten pod and all. It is not very good, but will interest the guests. The English vegetable marrow, a long white summer squash, is a very poor thing boiled, but sliced and cooked like eggplant makes a good dish for breakfast. The broad Windsor bean of England is worth trying. It is a pea rather than a bean, and can be planted very early. It is very attractive and interesting when in bloom, and bears abundantly. Taragon will grow in any garden, and the roots may easily be purchased. Just a little bit of it chopped very fine will give to salad dressing a piquancy that will surprise the guests. It is also a fine flavoring for soups, and gives the attractive taste to the famous pickles of the world. Parsley is easily grown. If the city people enjoy their cold meat better because the platter is decked with a few sprigs of it, why not furnish it? Cress, or pepper grass, sometimes pleases as an addition to lettuce.

The Russian apricot will bear only once in two or three years, but it is the most delicious fruit grown in this section. It is self sterile and so there must be two or three varieties grown near each other to provide for cross fertilization. The fall bearing strawberries and fall bearing raspberries are only playthings, but are worth while as novelties. When the September boarders come down to supper and find a dish of raspberries or strawberries set before them, they are amazed, and more pleased than amazed. The great effect of the novelties is the impression upon the people that the proprietor is trying his best to please them, and that is a very important impression to make upon the minds of the guests.

THE GARDEN BEAUTIFUL.—Finally, the garden should be so planned, planted and tilled that it will be attractive to the eyes of all the guests. They will find their way all over the place, no fence will keep them out; and they will certainly find their way into the garden. The rows should be as straight as a line can make them, and uniform distances apart, while all the angles should be right angles. The different sorts of vegetables should be arranged with some reference to harmony and contrast. Even a vegetable garden may be really beautiful. After the guests have been out and seen such a garden, they will eat the things served from it with a greater relish. When they return home from their vacation, and are describing to their friends their experiences, they will close their praise of the abundant table spread before them by exclaiming, "But my, you just ought to see the garden". It is worth

while to make the garden attractive to the eyes, to the aesthetic tastes of the guests, as well as to—"their internal workings".

REPORT OF SECRETARY.

M. B. CUMMINGS.

Our meeting last year was a most extraordinary affair. With the New England Fruit Show as our guests, and the commodious city hall in Montpelier full of apples; a budget of \$2,000, and an attendance in excess of 7,000 people, we reached high water mark. I hope in the course of a few years, we will have the honor of entertaining again the New England Fruit Show. The benefits are still reverberating from north to south and east to west.

We omitted, this year, our orchard meeting because of the infantile paralysis epidemic. We might have had a meeting a little later when the situation cleared up, but at that time it seemed that people were so busy it would hardly be worth while, and we thought it would be well to save what little money would be incurred by that meeting because we had rather a heavy draft last year on the funds of the Society.

In connection with the reports this morning, it just occurred to me that we might ask our county vice presidents to become more active in the Society work. The chief reason, for having a county vice president is to have somebody to look out for our interests, especially when we have a meeting in a certain county to arrange the local matters in connection with the exhibit. Since this matter of dues has come up I suggest that the county vice presidents be made collectors of dues for members in their respective counties. I am sure that the treasurer and secretary would be very glad of any extra help in that regard. It may be that such vice presidents might help a good deal in getting a little local money to make it possible for us to offer a little extra in the way of premiums.

I think our experience thus far this year in having a joint meeting with the Sugar Makers' Association attests very well to the mutual benefit value of meeting together. This year we invited the sugar makers to meet with us, and it has been our pleasure to have them with us at this time. If they see fit to invite us to meet with them, I hope we will act favorably upon such invitation.

Last month the secretary was authorized to go to the National Congress of Horticulture at Boston. Representatives of all of the societies, I think in the country, were asked to be there to consider two things in particular. One was the report and discussion of a U. S. treasury official concerning the Farm Loan Act in relation to loans on orchard lands.

The rulings of the Board are given herewith:

"The Federal Farm Loan Board has made the following important decision respecting loans on orchard and fruit lands:

"On orchards where the lands have no substantial value except for orchard purposes, no loans shall be made; where the lands have a basic agricultural value, such value shall be the basis for the loans; orchards shall not be regarded as permanent improvements, but shall be taken into consideration as enhancing the general value of the land and in determining its productive value."

The foregoing decision regarding the valuation of orchard lands is based upon that section of the Federal farm loan act which says that the basis for appraisement of lands shall be their producing power when used for agricultural purposes.

This decision does not mean that no extra valuation will be permitted on the lands specially adapted for intensive or specialized cultivation, but it simply means that very high values attributed to the fruit lands in certain parts of the United States will not be recognized as loanable values under the farm loan act.

Inasmuch as this attitude makes for the safety and security of the entire Federal farm loan system, it contributes to the advantage of the great majority of farmers of farmers of the United States.

It must be remembered that mortgages made under the farm loan act may run from 5 to 40 years. Fruit trees are not insurable. They can not be considered a part of the loan value of the land, because they are destructible. They are subject to disease, storms, and blights. While under the care of its present owner fruit land may be made to show large profits, there is no assurance that the present owner will outlive the mortgage, and his successor may be a man who would turn fruit land into a liability rather than an asset.

The 5 per cent interest rate under the farm loan act is made possible only because of the ability of the Federal Farm Loan Board to sell farm loan bonds bearing $4\frac{1}{2}$ per cent. The mortgages taken under the farm loan act

constitute the security for farm loan bonds. Admission of orchard lands at high valuation would increase the element of risk and cause investors in farm loan bonds to demand higher interest. The result would be an increase of interest rates to all borrowers under this system.

In this case the Federal Farm Loan Board has based its action on the hope of extending the greatest good to the greatest number."

The other more important matter that came up at that Congress was in regard to the standardization of fruit, the fixing of grades and the uniformity of package. The Bureau of Markets at Washington has been working nearly a year in collecting information concerning the different laws in the different states, and the Department men are of the opinion that in due time we shall be able to substitute for the Vermont, Massachusetts, Maine, Connecticut and New York and other laws, one law or set of regulations which will be applicable to all states. The Department is not asking that this be done immediately. It does not anticipate a compulsory law, but hopes that the societies will get together so that we will have one uniform standard grade throughout the whole country, and so far as they have been able to interview various societies they think that is quite possible, and they have sent me, as secretary of this Society, the first draft of the proposed uniform regulations which is printed herewith:

The following grade specifications and requirements for marking packages containing apples are submitted for the consideration of growers and dealers who are interested in the adoption of apple grading and packing regulations. The specifications are based upon the results of investigations conducted in States having apple grade laws, as well as in other apple producing sections. **WRITE TO THE BUREAU OF MARKETS AND EXPRESS YOUR OPINION IN REGARD TO THEM.**

GRADE SPECIFICATIONS.

"STANDARD FANCY" shall consist of hand-picked, properly packed apples of one variety, which are well grown specimens, normal in shape, uniform in size, of good color for the variety, and which are free from dirt, insect injury, fungous disease, bruises, and other defects, except such as are necessarily caused in the operation of packing. "Uniform in Size" shall be construed to mean that apples contained in any one package shall not vary in size more than one-half inch in diameter.

"STANDARD A" shall consist of hand-picked, properly packed apples of one variety, which are well grown specimens, normal in shape, of not less than fifty per centum of good color for the variety, and which are practically free from dirt, insect injury, fungous disease, bruises, and other defects, except such as are necessarily caused in the operation of packing.

"STANDARD B" shall consist of hand-picked, properly packed apples of one variety, which are well grown, and practically free from insect injury, fungous disease, or other defects; provided that apples having healed-over insect punctures, small scab or blotch infections, fruit spots, or other defects not including worm holes which, taken singly or collectively, do not materially deform or discolor the fruit, shall be admitted to this grade.

"UNCLASSIFIED" shall consist of apples which do not conform to the foregoing specifications of grade, or which though conforming are not branded in accordance therewith; provided that if more than ten per centum of the apples show decay, or worm holes, or are badly deformed or badly discolored by scab, blotch, insect injury, or other defects, the package containing them shall be marked **"Culls"** in addition to the other marks or brands required.

A tolerance of 6 per centum below the standard shall be allowed in the Standard Fancy grade, 10 per centum in the Standard A grade, and 15 per centum in the Standard B grade; provided that not more than half the foregoing tolerance values shall be allowed on any single grade specification or defect. Such tolerances shall apply to size, color, and other grade specifications and shall be computed by counting or weighing the specimens which are judged to be below the standard for the grade in any respect, and those which are found to be smaller than the minimum size, marked on the package.

In all the grades specified, the apples included in the face or shown surface shall fairly represent the size, color, and quality of the apples in the package.

MARKING REQUIREMENTS.—Every closed package containing apples grown (in a given State or by members of a given Association, etc.) which is sold, offered, or consigned for sale, packed for sale, or shipped for sale, shall bear upon the outside of one end in plain letters or figures, or both, the name and address of the person by whose authority the apples were packed, the true name of the variety, the grade of the apples therein contained when packed or repacked, and the minimum size or the numerical count of the fruit in the package. If the true name

of the variety is not known to the packer or the person by whose authority the apples are packed or branded, then such variety shall be designated as "unknown." Every package of apples which is repacked shall also bear upon the same end of the package the name and address of the person by whose authority it is repacked, such name and address to be preceded by the words "repacked by". The letters and figures used in marking or branding closed packages of apples under these provisions shall be of a size not less than twenty-four point Gothic. Provided that closed packages containing apples which cannot be readily marked on one end, so as to bear conspicuously the information herein specified shall be marked or branded in such other conspicuous place as may be prescribed by the regulations promulgated hereunder.

The marks and brands prescribed may be accompanied by any additional marks or brands which are not inconsistent with or do not in any way obscure the marks and brands required.

The minimum size of the fruit in all grades, shall be determined by taking the transverse diameter of the smallest fruit in the package. Minimum sizes shall be stated in variations of one-quarter of an inch, as two inches, two and one-quarter inches, two and one-half inches, two and three-quarter inches, three inches, three and one-quarter inches, and so on, in accordance with the facts. Minimum sizes may be designated by either figures or words and the word "minimum" may be designated by the use of the abbreviation "min."

REPORT OF TREASURER.

W. C. COLTON, MONTPELIER.

RECEIPTS.

1916.	
Nov. 9	Cash on hand\$ 227.03
21	Cash from Secretary, dues 74.00
25	W. J. Anderson, dues 5.00
29	New England Fruit Show Fund 929.14
Dec. 1	Pease and Tinkham, dues 5.00
1	George W. Perry, dues 1.00
1	G. H. Davis, dues 1.00
5	New England Fruit Show Fund 170.50
6	Sale of Fruit 3.50

6	J. H. Gourley, dues	1.00
11	Dr. E. R. Campbell, dues	1.00
11	New England Fruit Show Fund.....	45.00
28	New England Fruit Show Fund	15.00
30	Interest on deposits	3.45
1917.		
Jan. 16	Cash from Secretary, dues	7.00
22	State Treasurer, annual appropriation...	500.00
Feb. 6	Cash from Secretary, dues	12.00
Mar. 3	Cash from Secretary, dues	7.00
28	Cash from Secretary, dues	5.00
Apr. 19	Cash from Secretary, dues	10.00
June 15	Cash from Secretary, dues	7.00
July 1	Interest on deposits	7.11
		<hr/>
		\$2,036.73

SUMMARY.

Cash on hand	\$ 227.03
Dues	136.00
State appropriation	500.00
New England Fruit Show Fund.	1,159.64
Miscellaneous	14.06
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	\$2,036.73

NEW ENGLAND FRUIT SHOW FUND.

(W. C. COLTON, TREASURER, MONTPELIER, VT.)

RECEIPTS.

1916.		
Apr.	29 C. H. Stearns	\$ 5.00
	29 C. E. Knapp	5.00
	29 E. S. Brigham	5.00
	29 Jessie L. Noble	5.00
May	6 H. Harris & Co.	10.00
	6 W. A. Ricker	5.00
	6 E. L. Hildreth	5.00
	6 Geo. W. Perry	10.00
	10 A. T. Clark	2.50
	10 W. F. Ranney	5.00
	10 B. C. Buxton	10.00
	12 Luther Putnam	5.00
	13 D. H. Stafford	5.00
	13 Julian A. Dimock	5.00
	16 H. B. Chapin	5.00
	16 Col. H. S. Foster	5.00
	20 R. R. McRae	5.00
June	2 L. L. Marsh	5.00
Aug.	1 Geo. H. Mass	10.00
	19 J. O. Middlebrook	10.00
Sept.	30 Frost Insecticide Co.	20.00
	30 F. M. Culver	10.00
Oct.	5 J. B. Lippincott	10.00
	5 G. H. Prouty	25.00
	5 Bradley Fertilizer Co.	20.00
	5 Winslow Clark	10.00
	7 E. B. Peck	10.00
	21 Burlington Trust Co.	45.00
	21 E. H. Hallett	3.00
Nov.	9 Fottler Fiske Rawson Co.	45.00
	9 J. W. Jones & Co.	10.00
	9 F. H. Horsford	10.00
	17 C. L. Witherell	10.00
	17 Montpelier Board of Trade	500.00
	17 Cash from sale of plate exhibits	33.64
	21 J. W. Collins	5.00
	21 M. B. Cummings	5.00
	21 Radium Chemical Co.	10.00

	21 L. S. Morgan	15.00
	22 Capital Hardware Co.	10.00
Dec.	4 The Kentucky Tobacco Products Co.....	15.00
	4 Cash from sale of premium fruit.....	155.50
	11 Advertising	45.00
	28 J. G. Harrison & Son	15.00
		<hr/>
		\$1,159.64

EXPENDITURES.

		Voucher No.	
Dec.	8 M. B. Cummings, Burlington.....	703	\$ 17.27
Nov.	28 B. F. Lutman, Burlington	704	1.80
	28 W. C. Stone, Burlington	705	4.70
	28 George D. Aiken, Putney	706	7.04
	28 Prof J. H. Gourley, Durham, N. H.	707	26.63
	28 Prof. W. T. Macoon, Ottawa, Canada	708	71.00
	28 Prof. U. P. Hedrick, Geneva, N. Y.	709	83.58
	28 Ehrman Mfg. Co., Boston, Mass.	710	31.20
	28 Kamber, Frank & Bregstein, Bur- lington	711	10.00
Dec.	1 Dr. J. K. Shaw, Amherst, Mass.	712	34.01
	1 George W. Perry, Chester	713	8.96
	1 E. H. West, Dorset	714	21.73
	1 A. J. Eaton, So. Royalton	715	5.43
	1 Mollie M. Beals, Montpelier	716	25.00
	1 Pavilion Hotel, Montpelier	717	69.75
	2 C. W. Cummings, Hebron, Me.	718	4.00
	2 A. B. Howard & Son, Belchertown, Mass.	719	65.00
	2 H. G. Bowman, Hebron, Me.	720	6.00
	2 E. E. Lyman, White River Jct.	721	1.00
	2 W. C. Colton, Montpelier	722	1.00
	2 W. H. Atkins, So. Amherst, Mass.	723	7.00
	2 A. O. Ferguson, Burlington	724	2.00
	2 O. C. Searles, Southampton, Mass.	725	1.00
	2 S. E. Howard, Bennington	726	2.00
	2 H. B. Chapin, Middlesex	727	2.00
	2 A. A. Halladay, Bellows Falls	728	2.00
	2 W. R. Root, Southampton, Mass.	729	4.00
	2 Fred Steele, Stoneham, Mass.	730	2.00
	2 M. A. Butterfield, Jacksonville	731	10.00
	2 Luther Putnam, Cambridge	732	14.00
	2 C. C. Pettigrew, Mt. Vernon, N. H.	733	8.00
	2 Flintstone Farm, Dalton, Mass.	734	12.00

2	Gulley & Bonner, Rockville, Conn.	735	10.00
2	Mrs. D. C. Noble, Middlebury	736	14.00
2	W. C. Holcomb, Isle La Motte	737	17.00
2	Robers, Southington, Conn.	738	10.00
2	A. C. S. Randlett, Laconia, N. H.	739	15.00
2	T. K. Winsor, Greenville, R. I.	740	22.00
2	E. N. Sawyer, Salisbury, N. H.	741	39.00
2	A. H. Hill, Isle La Motte	742	62.00
2	A. L. Fish, Colerain, Mass.	743	24.00
2	E. L. Salisbury, Salisbury, N. H.	744	15.00
2	Washington Fruit Growers Asso., Washington, Conn.	745	21.00
2	C. L. Witherell, Middlebury	746	175.00
2	The Orchards, Bennington	747	127.00
2	Eastern Fruit & Nut Orchard Co., Burlington	748	14.00
2	Julian A. Dimock, East Corinth	749	15.00
2	E. H. West, Dorset	750	36.00
2	W. A. Root, Easthampton, Mass.	751	15.00
2	J. F. Moody, Hebron, Me.	752	9.00
2	E. B. Parker, Wilton, N. H.	753	14.00
2	Bearce Bros., Hebron, Me.	754	11.00
2	A. A. Conant, Hebron, Me.	755	17.00
2	A. T. Clark, Vergennes	756	22.00
2	D. R. Miller, Putney	757	21.00
2	R. L. Heminway, Middlebury	758	13.00
2	W. F. Ranney, Putney	759	17.00
2	The Chase Orchards, Buckfield, Me.	760	5.00
2	John French, Burlington	761	1.00
2	A. B. Howard & Son, Belchertown, Mass.	762	3.00
2	A. L. Buck, Hebron, Me.	763	5.00
2	W. G. Conant, Hebron, Me.	764	11.00
2	Conn. Valley Orchards Co., West- minster	765	4.00
2	E. E. Hutchinson, Hebron, Me.	766	3.00
8	Stanley Hargreaves, Burlington	767	6.00
8	Montpelier Greenhouse, Montpelier	768	18.00
15	Prof. C. V. Woodbury, Northfield	769	25.00
15	Buswell's Book Store, Montpelier	770	8.10
15	Free Press Association, Burlington	771	8.10
19	W. C. Colton, Montpelier	772	2.25
19	A. H. Hill, Isle La Motte	773	1.00
19	Conn. Valley Orchard Co., West- minster	774	3.00
19	O. C. Searles & Son, Southampton, Mass.	775	2.00

19	A. A. Halladay, Bellows Falls.....	776	3.00
19	E. N. Sawyer, Salisbury, N. H.....	777	4.00
19	W. F. Ranney, Westminster	778	3.00
19	A. B. Howard & Son, Belchertown, Mass.	779	2.00
19	The Orchards, Bennington	780	5.00
29	Vivian Hindley, Burlington	781	1.60
29	Miss E. Bingham, Burlington	782	10.00
29	Chase Brothers, Buckfield, Me.	783	3.00
29	W. G. Conant, Hebron, Me.....	784	2.00
29	The Orchards, Bennington	785	1.00
1917.			
Feb. 14	Washington Fruit Growers Assoc., Washington, Conn.	786	15.00
Apr. 2	M. B. Cummings, Burlington	787	15.00
May 14	M. B. Cummings, Burlington.....	788	7.70
14	Allen B. Rider, Boston	789	5.00
29	Miss E. Bingham, Burlington.....	790	5.00
29	M. B. Cummings, Burlington	791	100.00
Aug. 27	Miss E. Bingham, Burlington.....	792	3.88
27	M. B. Cummings, Burlington.....	793	10.00
Nov. 10	Miss T. E. Nevins, Burlington.....	794	6.58
10	M. B. Cummings, Burlington.....	795	18.30
24	M. B. Cummings, Burlington	796	6.00
24	Free Press Association, Burlington..	797	9.47
30	Cash on hand		378.65
			<hr/>
			\$2,036.73

Respectfully submitted,

W. C. COLTON, *Treasurer.*

I have this day examined the foregoing report and find it to be correct.

A. T. CLARK, *Auditor.*

Dec. 6, 1917.

SUMMARY.

Office expense	\$ 236.31
Lecturers	274.15
Premiums	958.00
Miscellaneous	189.62
Cash on hand	378.65
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\$2,036.73	

REPORTS OF COUNTY VICE-PRESIDENTS.**ADDISON COUNTY.****BY MRS. D. C. NOBLE.**

We think we have 10% of a crop this year, and there was comparatively little spraying done, much less than usual.

Mr. Witherell thought it would be well to speak of the young orchards in Addison county. Mr. Clark, of Shoreham, has 2,500 trees, McIntosh, Spies, Greenings and Wealthy; Mr. Anderson, Shoreham, has 2,000 trees; Mr. Witherell has 2,000 young trees in Cornwall and 2,300 in Shoreham; Mr. Loomis has 600 trees in Addison; Mr. Noonan 1,000 in Addison; Mr. Hemenway 1,000 trees in Bridport; Mr. John Sperry has 500.

Mr. Stevens, in Orwell, has mostly older trees. They say he had 3,600 barrels last year and about 2,000 trees, and averaged around \$6 or \$7 a barrel, and this year about 1,000 barrels, but we don't know what his price was.

Mr. Witherell got \$4 a barrel for seconds and \$5 to \$8 a barrel for firsts.

We think that the growth of young trees is everywhere very good.

CALEDONIA COUNTY.**BY E. H. HALLETT, ST. JOHNSBURY.**

The season of 1917 has been one of the worst for the horticulturists of Caledonia County, for many years. Excessive rain, little sunshine and low temperature made it about the hardest season in which to grow stuff, and even worse to harvest what was grown, that we ever experienced, and why our cellars and granaries are not entirely empty we readily understand. Apple trees showed considerable bloom, but on account of the lack of sunshine, the small apples never formed, and only a few parties had any surplus for the market. The largest crop reported was 300 barrels on one farm in Danville.

Small fruit, strawberries and raspberries would have been an average crop if favorable conditions had existed at time of harvest. As it was, a large percent of loss by

decay was the result. Vegetable growers, as amateurs, were more numerous than ever before. Lawns, driveways, hen yards and other locations, wholly unfit for the growing of vegetables, were used, and as a result some got fair returns and others scarcely got their seed back. Under these conditions but few bought freely in the early season, looking forward to an abundant supply from their own plot. Later in the season a great demand for vegetables came, but too late, as the professionals were not in a position to furnish, although prices were good. However, some good will come from the experience and many now realize what the horticulturist has to contend with in the way of disease, insect pests, and climatic conditions which no one can control, made many people realize as they never did before, that the road to success, for the horticulturists, is not always sure. Whether or no the coming season will be a repetition of the same we know not, but let us stand up, full of courage and enthusiasm, ready to face the future and do our individual part towards helping to feed the world.

ORANGE COUNTY.

BY G. A. MEIGS, RANDOLPH CENTER.

For the western part of the county the orchards have been neglected because of the scarcity of help. I know of several orchards of 50 or 75 barrels of number one apples, which were not picked. They were taken off by the high winds.

As far as the potato crop goes one man has four acres under the snow, another has three, and even though we have plenty of boys in our section we could not get the help to harvest the crop. I don't know of any apples shipped out from that part of the county.

The vegetables have had their innings this year, owing to the school superintendents and students of the district schools and we were in hopes of having a very good fair, but owing to the poliomyelitis at Randolph we were unable to hold it.

WASHINGTON COUNTY.

BY C. O. ORMSBEE, MONTPELIER.

There has been a steady improvement in the last six or eight years in the amount of trees planted in Washington county and in the quality of fruit, also in the care people are giving the trees.

A good many small trees have been set out, and we have thought all through Washington county, as a rule, the McIntosh group does a great deal better than anything else. Also the Fameuse, St. Lawrence and Wolf River, but the Greenings and Baldwins do not do anything.

There was a shortage of help this year.

WINDHAM COUNTY.

BY GEORGE AIKEN, PUTNEY.

To hear the talk at these meetings one would think Grand Isle county used to be the apple section and Bennington and Rutland counties the only sections that grow any now, but I think there are more young apple trees in Windham county than in Bennington and Rutland counties put together, although people don't hear of them because they are divided up into orchards of from 1,000 to 8,000 trees. We have three orchards of 8,000 trees, two or three of 5,000, and twenty or twenty-five of 1,000 to 3,000.

Several thousands of barrels were shipped to Colerain, Mass., to make apply jelly.

The varieties set are practically all McIntosh, Baldwins and Greenings, and if you could see the way the Baldwin trees grow down there you wouldn't wonder why they set Baldwins. I have seen young Baldwin trees that had been set ten or twelve years, and were twenty feet high perhaps, that they were picking two or three barrels from.

The crop this year was not very large. We thought we were going to have 30% of the crop. Prices came up and not much went to waste, and there probably were as many apples picked as usual. They paid a dollar a hundred for cider apples and I don't believe there were 50 bushels went to waste in the whole town.

The cherries and pears were rather short. Some orchards had a good crop of cherries and plums, and the biggest crop of peaches we ever had. Mr. Miller picked over a thousand baskets of peaches.

CHITTENDEN COUNTY.

BY M. B. CUMMINGS, BURLINGTON.

I believe that the fruit crop was very much below the average, both in quantity and quality. The large orchard at Charlotte, belonging to Mr. Holmes, had only a small crop this year, and of only fair quality. Several

orchards on the Shelburne Farms yielded very light, but the fruit was of pretty good quality. As far as I have learned, the family orchards about the county had a very light crop, but the value of it was so much more than usual that I think it balanced up pretty well.

In this county, and particularly in this city, this last season, we had quite an energetic campaign for adult, school and children's gardens. A good many hundred dollars worth of produce was grown under the direction of three garden supervisors and with the assistance of city officials, and citizens in the city. The University and Extension Service co-operated. I think that is the most outstanding feature in this section this last year. I believe it is proposed to carry that work on another year, provided the war continues and high prices prevail.

H. J. MERRILL.—We have had a good growth, and if we had had a little more sun it would have been better. Our orchard was damaged a good deal by mice and we lost about 300 trees, but we never have had any trouble before. I expect to use protectors for the trees this year.

BENNINGTON COUNTY.

By E. H. WEST, DORSET.

I might say that "The Orchards" have 10,000 new trees, and that makes about the largest planting in the east, with 38,000 trees. In my own orchards, since the number last reported, I have set about 8,000 trees, and these are the only two large commercial orchards in the county. There was a tremendous crop this year, and in some hill towns a bumper crop, but no one pays any attention to apples, outside of three or four farmers, and the apples are often fed to the stock or put into cider.

The value of natural windbreaks, such as it is possible to get in the hill towns, was well illustrated last fall, for in spite of the October gales the loss from windfalls was of little account.

Our berry crops were unusually good this year.

RUTLAND COUNTY.

By FRANK TEER, WEST RUTLAND.

We had about one-third of the usual crop and this was of very poor quality, but there has been quite an interest taken in the school gardens, especially in Rutland and in West Rutland.

The worms on the fruit were quite troublesome, especially in the latter part of the season.

The hay crop was very good and the potato crop was rather light.

More than the usual amount of grain was raised this year; some wheat was grown.

GRAND ISLE COUNTY.

By T. L. KINNEY, SOUTH HERO.

Our crop was poor in quality and small in quantity. In the spring we had a wonderfully fine bloom all through the county, but all the horticulturists were wishing for a little more sunshine to facilitate pollination of the blossoms. Later in the season we had hailstorms and a great many orchards were very much injured.

One of our good growers shipped McIntoshes to New York, and considered them not very good seconds, but received \$7 and \$8 a barrel. He had only the one grade,—so that even at these times there is a demand for apples. These are times when apples might be considered a luxury and not a necessity.

The setting of young orchards in the county is neglected. There are very few trees being set. I think the time will come round again when the farmers will take more interest in commercial orchards, for they are the great need of the present day, and the time will come when these commercial orchards will pay large incomes, and the common farmer is going to take notice and have a small orchard of his own. The time was when farmers would pay thousands of dollars for sheep; later the time came when they would go just as far to catch a sheep, and to-day the time has come when the farmers are anxious for sheep. It will be just so with the apple crop. By and by, when the commercial apple orchards are beginning to have their excellent incomes, and when beans drop from \$9 to \$1.50, and potatoes from \$2.25 to 30 cents a bushel, then will be the time when we will begin to look for something else, and that something else, in the State of Vermont, is going to be the apple, and it will be as profitable to the small farmer, in proportion to the amount invested, as will the commercial orchard. I think Grand Isle will eventually parallel some of the larger counties of our state.

LAMOILLE COUNTY.

BY LUTHER PUTNAM, CAMBRIDGE.

I report a shortage as far as Lamoille county is concerned. We have only two or three real commercial orchards in the county so far as I know. None of the small orchards are taken care of, and we might almost say that of two or three large orchards. The crop has been light and of poor quality. We have one thing to console us; cider apples brought \$1.10 a hundred at the railroad stations. We didn't have a chance to hand pick anything because of the terrible winds which damaged the apples.

As far as my own orchard is concerned I don't think I have sold over 50 barrels of apples this year, and many of them poor, selling from \$2 to \$6 a barrel. There are only one or two commercial orchards in the county.

I believe in compulsory spraying. I want you to think it over and I want it brought before the legislature of the state, and hope we may have a law that will compel the small orchardists to spray their trees. Let us fight for it until it is accomplished, then we can have some good fruit and a fair chance. I have seen small orchards where apples were remaining on the ground, and I asked, why don't you take care of your apple trees?

AWARDS IN 1917.

Class I.—Apples.

PLATE EXHIBITS.

		Prize.	Amount.
Arctic, Baldwin,	A. H. Hill, Isle La Motte, Vt.,	First,	\$ 1.00
	D. R. Miller, Putney, Vt.,	First,	1.00
	C. L. Witherell, Middlebury, Vt.,	Second,	.50
Banana,	C. L. Witherell, Middlebury, Vt.,	First,	1.00
	Eastern Fruit & Nut Orchard Co., Grand Isle, Vt.	Second,	.50
Bellflower,	C. L. Witherell, Middlebury, Vt.,	First	1.00
	Eastern Fruit & Nut Orchard Co., Grand Isle, Vt.,	Second,	.50
Bethel, Ben Davis,	L. Putnam, Cambridge, Vt.,	First,	1.00
	E. E. Hill, Eastern Fruit & Nut Orchard Co.,	Second,	.50
Delicious,	C. L. Witherell, Middlebury, Vt.,	First,	1.00
	Grand Isle, Vt.,	Second,	.50
Fameuse,	E. H. West, Dorset, Vt.,	First,	1.00
	A. H. Hill, Isle La Motte, Vt.,	Second,	.50
Golden Russett Hubbardston,	E. E. Hill, South Hero, Vt.,	First,	1.00
	Eastern Fruit & Nut Orchard Co., Grand Isle, Vt.,	First,	1.00
Kind,	Eastern Fruit & Nut Orchard Co., Grand Isle, Vt.,	First,	1.00
	A. H. Hill, Isle La Motte, Vt.,	Second,	.50
McIntosh,	E. H. West, Dorset, Vt.,	First,	1.00
	R. H. Holmes, Shoreham, Vt.,	Second,	.50
McMahon, Northern Spy,	L. Putnam, Cambridge, Vt.,	First,	1.00
	The Orchards, Bennington, Vt.,	First,	1.00
N. W. Greening, Pewaukee,	C. L. Witherell, Middlebury, Vt.,	Second,	.50
	The Orchards, Bennington, Vt.,	First,	1.00
R. I. Greening,	J. W. Hitchcock, Essex Junction, Vt.,	First,	1.00
	A. T. Clark, Vergennes, Vt.,	First,	1.00
Scott Winter, Spitzenburg,	E. H. West, Dorset, Vt.,	Second,	.50
	L. Putnam, Cambridge, Vt.,	First,	1.00
Sutton, Tolman Sweet,	C. L. Witherell, Middlebury, Vt.,	First,	1.00
	The Orchards, Bennington, Vt.,	Second,	.50
Westfield,	E. E. Hill, South Hero, Vt.,	First,	1.00
	J. W. Hitchcock, Essex Junction, Vt.,	First,	1.00
Wolf River,	Eastern Fruit & Nut Orchard Co., Grand Isle, Vt.,	Second,	.50
	J. W. Hitchcock, Vergennes, Vt.,	First,	1.00
Grimes, Palmer Greening	Eastern Fruit & Nut Orchard Co., Grand Isle, Vt.,	Second,	.50
	J. W. Hitchcock, Essex Junction, Vt.,	First,	1.00
	The Orchards, Bennington, Vt.,	First,	1.00
	A. H. Hill, Isle La Motte, Vt.,	First,	1.00

M. Blush,	J. W. Hitchcock, Essex Junction,	First,	1.00
Wealthy,	The Orchards, Bennington, Vt.,	First,	1.00
Jonathan	The Orchards, Bennington, Vt.,	First,	1.00
	J. W. Hitchcock, Essex Junction,	Second,	.50
	Eastern Fruit & Nut Orchard Co.,		
	Grand Isle, Vt.,	Second,	.50
Gano,	The Orchards, Bennington, Vt.,	First,	1.00
Roxbury,	E. E. Hill, South, Hero, Vt.,	First,	1.00
Bismarck,	R. H. Holmes, Shoreham, Vt.,	First,	1.00
Ontario,	The Orchards, Bennington, Vt.,	First,	1.00
Wagener,	C. L. Witherell, Middlebury, Vt.,	First,	1.00

Class IV.

CANNED FRUIT.

Mrs. John B. Chase, Lyndon,	First	\$3.00
Miss Miles,	Second	2.00

PEARS.

Class V.

Plate, Bartlett,	Eastern Fruit & Nut Orchard Co.,		
Plate, Anjou,	A. T. Clark, Vergennes, Vt.,	First,	1.00
	Grand Isle, Vt.,	First,	1.00
Plate, Winter Nellis,	A. T. Clark, Vergennes, Vt.,	Second,	.50
Plate, Lawrence,	L. Putnam, Cambridge, Vt.,	Second,	.50

BEST BOX COLLECTION.

E. H. West, Dorset, Vt.,	First,	\$ 5.00
Eastern Fruit & Nut Orchard Co.,		
Grand Isle, Vt.,	Second,	3.00

BEST SINGLE BOXES.

E. H. West, Dorset, Vt.,	First,	5.00
C. L. Witherell, Middlebury, Vt.,	Second,	3.00

BEST BARREL COLLECTION.

E. H. West, Dorset, Vt.,	First,	5.00
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SINGLE BARREL.

E. H. West, Dorset, Vt.,	First,	5.00
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BEST COLLECTION NAMED VARIETIES.

The Orchards, Bennington, Vt.,	First,	5.00
L. Putnam, Cambridge, Vt.,	Second,	3.00

**VERMONT WINNINGS AT NEW ENGLAND FRUIT SHOW,
HELD AT BOSTON NOVEMBER 1-4, 1917.**

BEST FIVE BOXES OF BALDWIN.

D. R. Miller, Putney, Vt., Second, \$15.00

BEST FIVE BOXES OF ANY OTHER VARIETY.

C. L. Witherell, Middlebury, Vt., Second \$15.00
J. A. Dimock, East Corinth, Vt., Third, 10.00

BEST BOX OF NORTHERN SPY.

The Orchards, Bennington, Vt., First, \$12.00
C. L. Witherell, Middlebury, Vt., Second, 8.00

BEST BOX OF SPITZENBURG.

C. L. Witherell, Middlebury, Vt., First, \$12.00

BEST BARREL OF R. I. GREENING.

E. H. West, Dorset, Vt., Second, \$10.00

BEST TEN PLATES.

The Orchards, Bennington, Vt., First, \$20.00

LARGEST AND BEST PLATE COLLECTION

The Orchards, Bennington, Vt., Third, \$ 8.00

Variety.

PLATE EXHIBITS.

	Eastern Fruit & Nut Orchard Co.,		
Baldwin,	D. R. Miller, Putney, Vt.,	Second,	\$2.00
Spitzenburg,	The Orchards, Bennington, Vt.,	First,	4.00
	C. L. Witherell, Middlebury, Vt.,	Second	2.00
Delicious,	C. L. Witherell, Middlebury, Vt.,	First,	4.00
Fameuse,	E. H. West, Dorset, Vt.,	Second,	2.00
Jonathan,	The Orchards, Bennington, Vt.,	Second,	2.00
Wagener,	The Orchards, Bennington, Vt.,	Second,	2.00
Northern Spy,	The Orchards, Bennington, Vt.,	Second,	2.00
Oldenburg,	The Orchards, Bennington, Vt.,	Second,	2.00
Opalescent,	The Orchards, Bennington, Vt.,	First,	4.00
Grimes,	The Orchards, Bennington, Vt.,	First,	4.00
Yellow Transparent	E. H. West, Dorset, Vt.,	First,	4.00
Banana,	C. L. Witherell, Middlebury, Vt.,	Second,	2.00

PREMIUM LIST FOR 1918.

All entries must be made in the name of the grower and the fruit must be of the exhibitor's production. Five specimens will constitute a plate exhibit. See previous reports for score cards.

CLASS I.—APPLES.

Plate Arctic	\$1.00	.50	
“ Baldwin	1.00	.50	
“ Banana	1.00	.50	
“ Baxter	1.00	.50	
“ Bellflower	1.00	.50	
“ Bethel .....	.50	.25	
“ Delicious	1.00	.50	
“ Fallawater .....	.50	.25	
“ Fameuse	1.00	.50	
“ Golden Russet	1.00	.50	
“ Hubbardston	1.00	.50	
“ King	1.00	.50	
“ McIntosh	1.00	.50	
“ McMahon White	1.00	.50	
“ N. Spy	1.00	.50	
“ N. W. Greening	1.00	.50	
“ Pewaukee .....	.50	.25	
“ Pound Sweet	1.00	.50	
“ Red Canada	1.00	.50	
“ R. I. Greening	1.00	.50	
“ Scott Winter	1.00	.50	
“ Shiawassee	1.00	.50	
“ Senator	1.00	.50	
“ Spitzenburg	1.00	.50	
“ Stayman	1.00	.50	
“ Sutton	1.00	.50	
“ Tolman Sweet	1.00	.50	
“ Wealthy	1.00	.50	
“ Westfield	1.00	.50	
“ Wolf River	1.00	.50	
	1st.	2nd.	3rd.
Best collection named varieties exhibit- ed on plates (Separate exhibits)...	\$5.00	\$3.00	\$2.00
Best display cooking apples on plates (Separate display)	5.00	3.00	2.00

Best display winter dessert apples on plates (Separate display)	5.00	3.00	2.00
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CLASS II.—ARTISTIC DISPLAY.

	1st.	2nd.	3rd.
Best artistic display other than boxes, barrels and plates	\$5.00	\$3.00	\$2.00

CLASS III.—PACKAGE EXHIBITS.

	1st.	2nd.	3rd.
Best exhibit of apples in box pkg. (3 boxes)	\$5.00	\$3.00	\$2.00
Best exhibit barrel pkg. (3 barrels)...	5.00	3.00	2.00
Best single box of apples	5.00		
Best single barrel of apples	5.00		

CLASS IV.—EXHIBIT OF CANNED FRUITS.

	1st.	2nd.	3rd.
Best display canned fruit	\$3.00	\$2.00	\$1.00

CLASS V.—PEARS.

Plate Anjou	\$1.00	.50
“ Bosc	1.00	.50
“ Clairgeau	1.00	.50
“ Dutchess	1.00	.50
“ Lawrence	1.00	.50
“ Vermont Beauty	1.00	.50
“ Winter Nellis	1.00	.50
Best plate collection of pears.....	3.00	2.00

CLASS VI.—VEGETABLES.

	1st.	2nd.	3rd.
Best collection named varieties potatoes.	\$5.00	\$3.00	\$2.00

Premiums of \$1.00 and 50 cents will be awarded for the best display of beets, carrots, celery, turnips, cabbages, onions, squashes and pumpkins. Only two specimens are necessary of the last two kinds; five specimens for all others.

1918 SPECIALS.

For best exhibit of 5 barrels, 10 boxes and 20 plates from any county, 1st, \$10; 2nd, \$5; 3rd, \$3.

For best display of cooked apple products in any of the 197 different ways, 1st, \$3; 2nd, \$2; 3rd, \$1.

The inside dimensions of a standard box are: length, $18\frac{1}{2}$; height, $10\frac{1}{2}$ and width $11\frac{1}{8}$ inches. Spruce makes the best material for boxes.

RECENT HORTICULTURAL BOOKS.

Productive Orchardring, new edition, by F. C. Sears, \$1.75, Publishing Company,—Lippincott.

Vegetable Forcing, by R. L. Watts, \$1.75, Publishing Company,—Orange Judd.

Strawberry in North America, by S. W. Fletcher, Publishing Company,—Macmillan.

Strawberry Growing, by S. W. Fletcher, \$1.50, Publishing company,—Macmillan.

Manual of Fruit Diseases, by Whetzel & Hesler, \$1.50, Publishing Company,—Macmillan.

Vegetable Gardening, by S. B. Green, \$1.00, Publishing Company,—Webb.

How to Make a Vegetable Garden, by E. L. Fullerton, \$2.00, Publishing Company,—Doubleday Page.

Greenhouse Construction, by W. J. Wright, \$1.50, Publishing Company,—Orange Judd.

Practical Orchardring on Rough Land, by S. W. Moore, \$1.00, Publishing Company.—New Werner, Akron, Ohio.

Vegetable Gardening, by J. G. Boyle, \$2.00, Publishing Company, Lea & Febiger, Philadelphia, Pa.

Practical Landscape Gardening, by R. B. Cridland, \$1.00, Publishing Company—De La Mare, New York City.

Plant Propagation, by M. G. Kains, \$1.50, Publishing Company,—Orange Judd.

Bush Fruits, new edition, by F. W. Card, \$1.50, Publishing Company,—Macmillan.

The Potato, by Gilbert, Barrus & Dean, \$1.75, Publishing Company,—Macmillan.

Modern Fruit Marketing, by B. S. Brown, \$1.25, Publishing Company,—Orange Judd.

COMPLETE ADDRESS OF ABOVE PUBLISHING COMPANIES.

Lippincott Company, Washington Square, Philadelphia, Pa.

Orange Judd Company, 321 Fourth Avenue, New York City.

Macmillan Company, 64 Fifth Avenue, New York City.
Webb Publishing Company, St. Paul, Minn.

Doubleday Page Company, Garden City, New York City.

Every progressive horticulturist should read some of these books. No man can afford to ignore the lessons that others have learned.

For other lists see 1914 Report, page 127, and 1915 Report page 102.

BUSINESS SESSION.

Report of nominating committee, by Mr. Hallett.

MR. HALLETT.—I am not going to make a nominating speech, but it does seem proper at this time, after the long years we have been doing work in this state, and the efficient work of the officers, that we say a few words of appreciation. There is one of our members especially who has been so interested in this work all these years that we ought to honor him with something more than being a county vice president. Some people are very modest, and Mr. President, you made a mistake the other day in appointing on the nominating committee one of the modest men.

Two-thirds of the nominating committee had it in their minds to elect this modest man as president of this Association. Not only two-thirds of the committee, but very many of the members of the Association have spoken of it in that way for several years. When we spoke to this modest man of course he had something to say, and he said, "it is not right for me to be president of this Society," he gave good and sufficient reasons for not being, but I have reference to Mr. Luther Putnam of Cambridge, whom we as members of the Vermont State Horticultural Society want to honor with this office at this time, and in time he will have the honor of being an ex president, and we hope that his strength may be continued so that he may meet with us very many years in the future.

MR. PUTNAM.—You don't know how much good it does me to have you intimate your appreciation of my work, but my hearing is not good and this would rather bother a presiding officer. I hope you will withdraw my name and put in some younger man.

MR. HALLETT.—It is not necessary to take any further action, and will place in nomination the list of officers for

the ensuing year. We recommend the election of these officers by the secretary casting one ballot for the same.

President, George D. Aiken, Putney.

Secretary, M. B. Cummings, Burlington.

Treasurer, W. C. Colton, Montpelier.

Auditor, A. T. Clark, Vergennes.

EXECUTIVE COMMITTEE.

George D. Aiken, Putney.

M. B. Cummings, Burlington.

E. S. Brigham, St. Albans.

C. J. Ferguson, Burlington.

C. L. Witherell, Middlebury.

The secretary cast one ballot for the officers nominated by the nominating committee, and those named were declared elected for the ensuing year.

MR. HALLETT.—Last evening one of the sugar makers from Montpelier extended an invitation to the Sugar Makers' Association and the Horticultural Society to meet with them again in Montpelier. We have always had very pleasant times in Montpelier, but the east side of the state has not been worked as thoroughly as it should be. I wish to invite the State Horticultural Society and the Sugar Makers' Association, providing they continue to meet with the Horticultural Society, to meet in St. Johnsbury for their next annual meeting. This will care for the northern part of the state. Orleans county is a large producer of maple sugar and can get to St. Johnsbury very well. We will endeavor to make as large an exhibit as possible, and hope you can help us along on that side of the state.

REPRESENTATION AT UNIVERSITY OF VERMONT INFORMAL COUNCIL.

President West read the following letter;

November 8, 1917.

MR. E. H. WEST, President,

Vermont Horticultural Society,

Dorset, Vermont.

DEAR SIR:—At a meeting of the Executive Committee of the Board of Trustees of the University of Vermont and State Agricultural College held some little time ago, the proposition of the formation of an informal council, having advisory relations only, which should be asked to meet twice

a year to consider the public relationships of the College of Agriculture in its several phases of instruction, research, teaching and extension, was broached.

The committee approved the proposition and submitted same to a committee consisting of the President, the Deans, and the Comptroller. This Committee has considered the matter and has still further approved it and I am authorized as Dean of the College of Agriculture, to write you touching this matter and suggest membership. The body will be made up of the President of the University, the Dean of the College of Agriculture, the Director of the Experiment Station and the Director of the Extension Service, ex-officio; of two representatives of the Executive Committee of the Trustees, the Commissioner of Education, the Commissioner of Agriculture, two delegates appointed by the State Grange, two appointed by the Federation of Women's Clubs, and one each by the Vermont Dairymen's Association, the Vermont Horticultural Society, the Vermont Maple Sugar Makers' Association; and the Presidents of the twelve Farm Bureaus will be asked to appoint one of their number to serve upon this council.

The University will pay the expense accounts of the appointed delegates to the meetings, which will be called by the President of the institution. It is suggested that the delegates of your body may be chosen at the next meeting.

It should be understood that this proposed council will possess no legal and no legislative powers. Its purpose will be advisory and recommendatory. It is believed, however, that coming together say twice a year, it will be of distinct service to us at the institution and that we here may be able better than heretofore to sense the needs of the State and we trust better enabled to meet them.

I sincerely trust that at the next meeting of your organization, this matter may be brought up and proper election made.

Yours truly,

J. L. HILLS,

Dean.

PRES. WEST.—Perhaps the Horticultural Society had better at this time elect a delegate. I will call for nominations.

MR. HALLETT.—I move that the Chair appoint some one to act in that capacity.

Motion seconded and carried. The matter was their left in the hands of the president to act at his leisure.

LIFE MEMBERS.

Aldrich, A. W.Springfield
 Allen, R. R.South Hero
 Anderson, William J.,
 Mount Hermon, Mass.
 Ashley, M. W.Hardwick
 Bristol, E. S.Vergennes
 Buxton, B. C.Middletown Springs
 Buxton, Mrs. B. C.,
 Middletown Springs
 Chenoweth, Prof. W. W.,
 Amherst, Mass.
 Christopher, John,
 Jacksonville, Fla.
 Clark, A. T.Vergennes
 Cummings, Prof. M. B.Burlington
 Curtis, E. D.,
 Avalon Farms, Bantam, Conn.
 Darrow, George M.,
 Dept. of Agri. Washington, D. C.
 Darrow, WilliamPutney
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 Small, F. M.Morrisville
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 Dept. of Agri. Washington, D. C.
 Teer, FrankW. Rutland
 Terrill, Hon. Geo.Morrisville
 Vail, Theo. N.Lyndonville
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 Vaughan, R. E.Madison, Wis.
 Waugh, Prof. F. A.Amherst, Mass.
 West, E. H.Dorset
 Wister, John C.Germantown, Pa.

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 Lawson, Wm. Newport
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Phillips, Hon. C. F.,
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Pierce, T. C. N. Clarendon
Pike, P. B. Stowe
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Chestnut Hill, Mass.
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Middletown Springs
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Richardson, L. H. Brattleboro
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Robinson, W. E. Newport
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Root, L. C. Farmington, Conn.
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Sargent, F. H.,

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Smith, Ezra Vergennes
Smith, F. H. Ludlow
Smith, Hon. C. F. Morrisville
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Smith, P. S. Montpelier
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Tenning, G. H. Putney
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Torrey, C. B. Westminster
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 Wellington, J. W.,
 Exp. Sta., Geneva, N. Y.
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 Wentzel, Paul ... Manchester Depot
 West, Mrs. E. H. Dorset
 Westermayer, A. J.,
 90 Nassau, New York
 Wettyn, E. O. Jamaica, N. J.
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 Wheelock, M. W. Montpelier
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 White, R. P. Bristol, Va.
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 Whitehill, H. E. Ryegate

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 Wilder, Mrs. H. H. South Hero
 Wilkinson, Prof. A. E.,
 Ithaca, N. Y.
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 Wilson, Fred Newport
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 Wiltfrank, F. South Hero
 Winslow, Chas. N. Clarendon
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 Witherell, C. L. Middlebury
 Witherell, Mrs. C. L. Middlebury
 Witherell, H. W. Shoreham
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 Wright, E. L. Middlebury
 Wright, G. H. Middlebury
 Wright, H. J. Swanton
 Young, Alexander Bennington
 Young, A. I. Barre
 Young, I. R. Montpelier
 Young, L. P. Montpelier
 Yout, C. E. Middlebury

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REPORT
OF THE PROCEEDINGS OF THE
FORTY-SEVENTH ANNUAL CONVENTION
OF THE
Vermont
Dairymen's Association

HELD AT
The Armory, Burlington, Vermont
January 9, 10, 11, 1917.



ST. ALBANS MESSENGER CO.
1917

LETTER OF TRANSMITTAL.

To His Excellency, Horace F. Graham, Governor of Vermont:—

Dear Sir: In accordance with the requirements of the Vermont law, I have the honor to transmit to you the Forty-Seventh Annual Report of the Vermont Dairymen's Association.

Respectfully submitted,

F. H. BICKFORD,
Secretary.

July 10th, 1917, Bradford, Vt.

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OFFICERS OF THE VERMONT DAIRYMEN'S ASSOCIATION.**PRESIDENT.**

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H. B. CURTISSt. Albans

SECRETARY.

F. H. BICKFORDBradford

TREASURER.

M. A. ADAMSDerby

AUDITOR

F. L. DAVISHartford

PROCEEDINGS OF THE 47th ANNUAL MEETING OF
THE VERMONT DAIRYMEN'S ASSOCIATION,

The Armory, Burlington, Vermont, January 9-10-11, 1917.

COMPILED BY F. H. BICKFORD, SECRETARY.

The 47th annual meeting of the Vermont Dairymen's Association opened at 2 o'clock, P. M. Tuesday, January 9th. The invocation was offered by Rev. C. J. Staples of Burlington. Mayor Albert S. Drew welcomed the members of the Association in a cordial manner and while he was unable to proffer the historic key of the city to the guests, saying it had been carried away by the Commercial Travellers' Association following their convention of last year, he assured the dairymen that the latch string of the city was out and would always be out to them and a welcome awaiting.

H. B. Curtis of St. Albans, one of the vice-presidents, responded in a pleasing manner. Among other matters of interest he said that the Vermont Dairymen's Association was organized in 1869 by O. S. Bliss of Georgia who was Secretary of the organization for a number of years. Through the courtesy of a daughter of Mr. Bliss, Mr. Curtis exhibited a Secretary's book containing a report of the first twelve meetings; the first one being held at Montpelier in October. It was the custom for several years for the officers and trustees (three from each county) to meet in October, generally at Montpelier to arrange a program for the winter meeting. During those first years the meetings were held in small places and the record shows that one was held at Milton and also at Brandon.

PRESIDENT'S ADDRESS.

H. K. BROOKS, ST. ALBANS.

Your Honor The Mayor, Members of the Vermont Dairymen's Association, Ladies and Gentlemen:

Having rounded out another year we meet in annual convention as is our custom. The beginning of the new year seems to be fitting time for us to get together and talk over those problems not definitely settled, and perhaps some of those that have been, and in that way pass along information to others, and to glean knowledge from those teachers and instructors that have very kindly come here to help us.

The past year has been a most unusual one with which dairymen have had to contend. Who is the man that last spring could prognosticate with certainty and tell the present high cost of living of the dairy cow? Early last Summer with old process oil meal at thirty and a half dollars per ton and other concentrates in like proportion it was high time for us to lay in a winter's feed supply. Many dairymen did avail themselves of those prices, and now for their business acumen are reaping a good reward. Some did not, and of these I believe a large percentage are not now members of cow-test associations. It is absolutely important in these times of high cost feeds to know exactly the feed cost of milk and butter fat, and to do this cow-test work offers an exceptional opportunity. In Franklin County we have one of the largest and oldest associations in the state, thanks to Dr. Hills, for we had heard him talk cow-test for about three years before we started; and last year we had grown to such proportions we had to put on two testers, and now we have nearly enough dairies waiting to warrant putting the third man in the field. Besides getting at the cost of production it materially enhances the value of your good cows. I have seen cows sold at auction and private sale for high prices, that had they not been backed by records would have brought only ordinary sums, for they lacked the bloom and prepossessing appearance of the fresh cow.

It is also very important to keep a good set of farm accounts and the experiment stations are giving this matter

considerable attention, as shown by the farm management demonstrations held here and there all over the country. The county agents give valuable assistance in this and through them we can get farm account books at the cost of only a few cents. A good set of farm accounts is very likely to place us in the right light when talking over matters of a private nature with our bankers; they will come to know more of the business side of farming and we to know more of the business of bankers. It may be a step in the direction of heading off some of Vermont's millions that go west and south for the development of that country now sent there by our banks and trust companies and which we so much need here at home.

We grant that a good dairyman has good cows. Our conditions for producing them are quite ideal; good well-watered pastures generally prevail and an abundance of roughages of the right kinds produced in our tilled fields place us in position to produce them as cheaply as can be done anywhere. While there may be good grade producers, pure breds are more to be desired. We find quite often that marked success has been attained in breeding grades and that the purchase of the desired pure breds was too long postponed.

I hold that if a dairyman can breed good grades he can breed better pure breds; by doing this the profits are likely to be increased, due to the enhanced value given by the pedigrees. All of the dairy breed associations provide for official work in some form, that is registry of merit, advanced registry and so on. It is well said that it is the height of ambition of all pure bred cows to enter this distinguished class; it happens that some reach the top of the list or near it, and then besides adding much to their own worth the value of the progeny is greatly increased.

I believe the Animal Husbandry Department of the Station can show that it is profitable to raise good dairy cows; and to do this skim milk is quite essential in growing the young things. I mean dairy cows that show very markedly the characteristics of some of the four dairy breeds, that is, Jersey, Guernsey, Holstein, or Ayrshire. To do this we should sell butter fat only in some form from our farms. I believe we can to our advantage let those that are near the large consuming centers sell their whole milk. It would seem to be economical to get milk to the consumer as soon as possible after production, and then the short haul helps keep the cost of transportation down.

Right here, geographically speaking, we come in with our sweet cream. Much beyond should come butter. This is already being increasingly produced in the alfalfa and grain growing sections of the west. Butter even comes into our markets from far away Argentina and Australia. Refrigerated transportation seems to make this possible. Now we will follow up that whole milk to the consumer's table with our sweet cream; it may be in the form of ice cream, and to the whole milk producer we will sell our surplus dairy cows. This gives us desirable outlets for two important products of our farms and instead of drawing upon the fertility we will constantly be adding to it. This is quite important in these times of high cost chemicals, especially in those forms that contain nitrogen for this element most of all is left at home. If we apply phosphoric acid with this home fertilizer we will get along quite well for some time to come or until we can again get potash.

It is high time the producers combine with the distributors and start a campaign of educational advertising of the food value of milk and its products. What a tremendous effect it would have if we could launch forth under the title of the Producers' and Distributors' Association, Inc., telling the people of the wonderful animate machine we have in dairy cows that can take the inert but potential roughages of our farms and convert them into farms of food possessing chemical tension that imparts more living energy in better forms than can be had in any other food.

There is an abundance of facts and figures that prove the consumer can get more of this food value for a dollar expended than can be had in any other food. Have all this appear regularly in the leading city papers and other periodicals. The great question of surplus would soon fade away and a steady demand for increased production would take its place. Something of this was done at the Dairy show in Springfield but what is necessary is unity of action all along the line.

The showing made by the State at this great Dairy Show was excellent considering we have absolutely no funds to provide for a contingency of this kind. I feel very sure the Commissioner of Agriculture must have taken funds here and there from his other departments already in great need of every cent they get to make the excellent display that was made. Some how or other he seems able to make a little go a long way; not a bad fault after all, I admit.

The lesson to be learned is that we should provide a contingency fund, and I believe we should go on record as favoring a scheme to induce the present session of the Legislature to place a few thousand dollars at the disposal of the Governor, the Secretary of State and the Commissioner of Agriculture to be expended in exploiting the products and resources of the State at that show. It would seem to be the time and place to do this for thousands of people gather together and we should show up the advantages of our State along side of the other states in the best manner possible.

THE DAIRY PROGRAM OF THE VERMONT COUNTY AGENTS.

**THOMAS BRADLEE, DIRECTOR, EXTENSION SERVICE,
VERMONT.**

The general trend which events in the dairy world have taken, not only in the last few years but more especially in the last few months, has brought the interest in dairymen to its present "high pitch". Among the first of these important events may be mentioned the investigations in several states as to the cost of producing milk. A compilation of figures shows that it costs from \$1.21 in Jefferson county, N. Y. to \$2.39 in Massachusetts to produce one hundred pounds of milk. The recent investigation by the Boston Chamber of Commerce showed that it cost from \$0.0237 to \$0.0385 per quart to produce milk in New England which is equivalent to \$1.091 to \$1.775 per hundred pounds. Our own experiment station is about to publish figures gathered in 1911 which show that six years ago it cost from \$1.30 to \$1.50 to produce 100 pounds of milk.

The increased cost of feed and labor brought about by recent temporary changes in economical conditions has aroused farmers to the fact that they must either produce more cheaply or sell at a higher price. The findings of the Wicks' investigation committee in New York State have not only brought these facts home to milk producers but have likewise put them before the public in a way that it has not been possible to do heretofore. The newspapers have laid more stress on facts furnished by this committee than on facts furnished by educational agencies.

The successful campaigns for increased prices, waged by New York and New England producers have given farmers renewed faith in their own business. It has shown the dealers that milk must now be bought at a price which will afford the producer a reasonable profit. It has awakened the consumer to the fact that he too must be willing to concede a fair profit to the producer, as well as to the dealer of this important food product.

At the recent annual conference of Vermont county agents, held at the State University, a committee of these agents counselled with the instructors in dairy husbandry of the Agricultural College. It was felt that the time was

ripe for a constructive dairy program. They considered what had been done in Vermont and elsewhere, and tried not to do something new but to bring out relationships and summarize the things that are now being done.

They took as the basis of their assumption, stated in the object of this program that the dairy industry in this state is not now on a permanent basis, some of the facts have been brought out in the farm management demonstration work which the Extension Service of the State University is doing, particularly the striking fact that in eight Vermont counties the average labor income of the 514 farmers whose records have been taken is only \$409. Three fifths of these farmers made less than the average—which is just about a hired man's wages—and one-fifth lost money, if they pay interest on their money invested in the farm.

This program follows:—

“To assist in improving the dairy conditions and placing the dairy industry on a permanent basis by furnishing information as to dairy conditions and encouraging related educational projects.

This to be done by:

1. Increasing efficiency through;
 - (a) Dairy improvement associations.
 - (1) Weighing milk and feed.
 - (2) Discarding low producing individuals.
 - (3) Feeding economical rations.
 - (b) Economical production and purchase of feeds.
 - (c) Dairy farm management analyses.
 - (d) Accurate accounts.
 - (e) Improving quality of products.
 - (f) Standardization of products.
 - (g) Using pure-bred sires of individual merit.
 - (h) Prevention of disease.
2. Encouraging cooperative ownership by farmers of milk shipping and manufacturing facilities, by furnishing facts as to
 - (a) The principles of cooperative organization.
 - (b) The requirements for and cost of shipping stations, creameries and cheese factories.
 - (c) Constitution and by-laws of cooperative ownership associations.

3. Increasing consumption of milk through**(a) An educational campaign to demonstrate:**

- (1) Its comparative food value.**
- (2) Its comparatively low cost.**
- (3) Its possibilities as a substitute for more expensive foods.**

This program as drawn up by the county agents, may be adopted in whole or in part in any or all of the counties by cooperation with the county agents. Their function in connection with this work is educational, is to furnish information, to advise. They need the help of your association, the State and local Granges, and every other Vermont agency which is interested in battering the dairy industry.

To actually bring about greater efficiency in dairying, to build cooperative milk plants and to advertise milk as a food, is the business of the farmers. We feel that with the increasing interest which they have shown during the past few months they will accept this program and put it into effect.

CREAMERY INSPECTION IN VERMONT.

E. S. BRIGHAM, COMMISSIONER OF AGRICULTURE, VERMONT

The first movement toward the inspection of creameries in Vermont was made in 1910. An act passed by the legislature of that year required the commissioner of agriculture, upon the written request of three tax payers to inspect, or cause to be inspected, as to its sanitary condition any creamery, cheese factory, condensary, or receiving station for milk or cream. It was further specified that cognizance should be taken of the condition in which milk or cream were delivered; if there was reason to believe that such milk or cream were produced and kept under unsanitary conditions, the commissioner was required to inspect the dairy and premises of the producer and make such orders as should tend to improve such milk or cream to a minimum standard. If these orders were not complied with the commissioner was given authority to order all creameries, cheese factories, etc. within the neighborhood, to refuse to receive the milk or cream from the offending dairies until the same was kept and delivered in a sanitary condition.

The legislature of 1912 amended this act by striking out the provision requiring a written request from three tax payers for an inspection and substituted a provision in lieu thereof requiring the commissioner of agriculture to inspect all plants twice each year. No provision in the way of an increased appropriation was made for carrying out this requirement.

WHAT HAS BEEN DONE.

The commissioner of agriculture, upon taking office in 1913, was confronted with the following problem: There were approximately 250 plants in the State which required inspection under the law twice each year. An inspection to be at all adequate would require a day's time for each visit at a plant, or 500 days' time for an inspector.

The inspection to be at all successful or useful requires a man with sufficient training in the handling of dairy products so that he can advise factory managers how to overcome any difficulties they may be having and one with sufficient tact and judgment to go back to the farm and secure the cooperation for making necessary improvements of farmers who are sending poor products.

The funds available at the time enabled us to employ an inspector for 9 months and pay his travelling expenses. The legislature of 1915 increased the appropriation of the state department of agriculture \$3,000. Since this appropriation was available we have employed one inspector for full time and one for two or three summer months, devoting to this purpose a little over one-fourth of the entire sum available for the department of agriculture.

These inspectors have travelled by automobile when the roads would permit and have done their best to carry out the terms of the inspection law. The plants have been scored as to their equipment, sanitary conditions and methods of operation. Suggestions have been made for improvement of bad conditions, which have for the most part been complied with. I believe that our dairy manufacturing plants are in better condition to-day as a result of this inspection. Tests for acidity have been made during the summer months, which show that more than half of our cream is delivered at the plant in a condition too sour to enable the butter-maker to ripen it and make the finest quality butter. Butter has been tested for salt and moisture and in a few cases, where it seemed to be a consistent practise to incorporate an illegal amount of moisture, steps have been taken to put an end to this practise. Figures have been collected for the purpose of ascertaining the volume of the State's dairy business and of determining what proportion of our dairy products is marketed in the form of milk, cream, butter and cheese. Mr. Ellenberger of Cornell University, who has served as inspector of cheese factories, laid especial emphasis upon instruction work which would lead to the adoption of the best methods of making fine quality cheddar cheese.

Although the inspectors have visited many farms and some farmers have been directed to clean up, we have not ordered any plant to cease buying from a farmer until our orders were complied with for the reason that in most instances farmers have been willing to comply with a reasonable request for improvement and with such limited inspection as we could give with the funds available, such orders would amount simply to a persecution of the few whom we are able to inspect while hundreds of others equally as culpable would go scot free. You may readily see that it has been impossible for one man in the 300 days working time in a year and another man working 60 days to inspect 250 plants twice each year without doing the work hurriedly and inefficiently. At least half a day should be spent at a plant noting the condition of the milk and cream as

they arrive and the remainder of the day is too short a time to make the necessary farm inspections. Either the creamery inspection laws should be amended to require fewer inspections or sufficient money should be provided to carry out the provisions of the law as it now stands, for it seems hardly fair to require the impossible of an officer,—at least it is not pleasant for the officer.

ADEQUATE INSPECTION

The question naturally arises as to what force of inspectors would be necessary to enable us to carry out the creamery inspection law and to make an adequate inspection of the 250 plants handling dairy products in Vermont together with the farms which are found to be sending milk and cream of poor quality. The Agricultural Gazette of Canada for November contains a very complete statement as to what is done in the way of creamery inspection in several provinces of Canada, which country is bound in the future to be a competitor of ours in the market. The Province of Quebec employs a local inspector for each factory division containing an average of 42 factories. The Province of Ontario employs an inspector for each 40 plants. These local inspectors have over them supervising inspectors. The province of New Brunswick, which has 48 creameries and cheese factories, employs four men. The work outlined for these inspectors is similar to that which we are doing in Vermont. Assuming that our dairy industry is better developed and that our plants are more easily accessible, the smallest force of men which could in any way, adequately do the inspection work required by law, is in my opinion, four. A man of sufficient experience and judgment to do the work properly and accomplish the results desired would cost from \$1200 to \$1500 per year. The travelling expenses of an inspector for the year will run approximately \$1500. It would, therefore, cost \$3000 per inspector, or \$12000 per year for four inspectors, the force necessary to do the work required by law.

At this point it may be well for us to consider the relation of inspection work done by the State of Vermont to that carried on by health boards of cities in which our dairy products are marketed. The towns and cities of Massachusetts, which are our leading markets for milk, have authority under the law to regulate their milk supplies. The local officials to whom the problem is delegated, draft regulations determining standards of production and handling for milk, which seeks a market in the particular municipal-

ity over which they have jurisdiction. The city of Boston, for instance, has certain regulations and sends its inspectors to Vermont each season to inspect the barns of dairymen who produce milk and cream sold in that city. Much unfavorable criticism has been aroused by the requirements of these inspectors. The matter is outside of our jurisdiction. If our dairy products seek a market in a city, we have no alternative but to observe the requirements laid down by the officials of that city who have regulatory powers. It seems to me that under the score card system employed, a dairyman's fitness to produce milk is determined not by the kind of milk he produces but by the kind of barn in which it is produced. Concerning this point, Dr. Eugene R. Kelley of the Massachusetts Board of Health said at the Vermont Health Officers' School last summer: "The fundamental thing is intelligent, clean methods, and any man can produce clean milk,—cleaner milk from old dilapidated barns, with clean methods, than from some millionaire barn, with a dairy school man running it, using unclean methods."

I believe our state inspection should be done in a different way, as is contemplated by our inspection law. Our inspectors should make tests of the milk and cream as it is delivered at the plant. The farms sending milk or cream below a certain standard should be visited and suggestions made for changes in methods of handling which will improve the product to a reasonable standard, certain fundamental things should be insisted upon: manure and dirt should be kept out of the milk, milk utensils should be kept clean and milk and cream should be kept in a clean place in such a way that it will reach the factory in good condition. Producers who refuse to comply with such simple requirements should be made to do so. The object should be, however, not to work a hardship upon anyone but to try to secure the cooperation of all to produce first grade products.

I do not believe, however, that creamery inspection alone will have the desired effect in improving the quality of our dairy products. With adequate inspection there must go hand in hand a reform in another direction. We have fallen into a vicious habit in Vermont of paying for dairy products by the hundred weight or by the pound without regard to their quality. Any man who has handled milk or cream knows that it costs more in labor or equipment to produce and deliver good milk or cream than it does to produce and deliver poor milk or cream. Therefore, when the same price is received for the poor article

as for the good article a premium is placed upon the production of the poor article. What we need is the adoption on the part of our creameries, cheese factories and shipping stations of a system of milk and cream grading and the basing of the price paid upon the quality of the goods received. The right kind of creamery inspection will make the adoption of such a system possible because the grading may be done under the supervision of the state inspector and the patron will, therefore, have greater confidence in the way in which it is done.

An adequate inspection force would also enable us to enforce the testing law enacted by the last legislature. Our inspectors would have time frequently to test samples of milk and cream in each plant, thereby giving the patrons greater confidence that the testing is properly done.

IS INSPECTION WORTH WHILE?

There has never been a time in the history of the dairy industry when consumers are paying so much attention to the cleanliness of dairy products. This arises in part from the attention which has been directed to these products by health officials with reference to their ability to carry germs of contagious diseases. It also arises in part from the general tendency of people to scrutinize more carefully than ever before the conditions under which their food is produced. Since under present day conditions of long distance transportation the consumer cannot himself inspect the manufacture of his food, he looks to some competent authority to do this inspection for him. It goes without saying that the best market for dairy products will go to that State which shall exercise the greatest care in its supervision over the production and manufacture of its products. I believe that a good sensible inspection of dairy products has the possibility of adding value to the dairy output of Vermont. We must bear in mind in this connection that oleomargarine, the leading substitute for butter, is made under the most rigid inspection rules enforced by the Federal Government, and one of the most effective weapons that we could use against bogus butter would be a guarantee of sanitary conditions of manufacture of butter equal to those of oleo. A representative of the Federal Food and Drugs Bureau has for two seasons been located along the northern border of Vermont for the purpose of inspecting milk and cream purchased in Canada by some of the large milk and cream dealers on this side of the line. At one time an embargo was threatened by these officials if certain recommenda-

tions regarding improvement were not carried out. There is reason to believe that these same Federal inspectors may next inspect products handled by our Vermont factories and prohibit shipment in interstate commerce of products which do not come up to a reasonable standard. I believe that Vermont should look after its own affairs and so set its house in order that we may invite the purchasers of our products without apology to visit our farms and our factories to see the operations of production and manufacture. I say this not for reasons of sentiment but for reasons of good sound business. We are but a few hours distant from the great metropolitan centers of this country in and around which are located millions of consumers who can afford and are willing to pay high prices for dairy products if they are assured of fine grade products produced in a cleanly manner. If we take such steps as may be necessary to give these assurances Vermont dairy products will have no need to fear any competition which may come in the future.

HOW SHALL WE GET THE MONEY.

Assuming then that adequate creamery inspection is worth while, the problem of securing the necessary funds is next in order. I put into the estimates which I presented to the budget committee the sum of \$3000 with which to employ another creamery inspector. It may be possible, especially with the cooperation of this association, to secure an additional appropriation of this amount. I do not believe, however, that the Vermont legislature will for some time be willing to appropriate the sum of \$12,000 for creamery inspection.

Some milk contractors and some creamery operators have signified their willingness to pay the salary and expenses of an inspector if he could be under the supervision of the commissioner of agriculture. In the absence of legislative authorization I have felt obliged to decline to receive such offers of assistance because of the trouble which might easily arise if this practice were followed. However, if the owners of our creameries, cheese factories, condensaries and shipping stations are willing to be subjected to a tax for the purpose of raising revenue for an adequate inspection I am perfectly willing to favor such a proposition. From the reports which we received from these plants in 1914, about 30,000,000 lbs. of butterfat were handled through them, if we count 100 pounds of milk as 4 pounds of butterfat. A tax of .0004 cents per pound of butterfat would raise a revenue of \$12,000, which would

give the plants of Vermont a very adequate inspection service. This would mean 1 cent for each 3 pounds of butter made, 1.6 cents per 100 for milk testing 4% and about 1 cent for each 7 pounds of whole milk cheese. It would cost a creamery making 100,000 pounds of butter a year \$33.33. I would like to have the factory managers who are here at this meeting take this matter under consideration and I would like very much to discuss the proposition with them. If the project meets with favor a bill should be presented to the legislature at this session. This bill should require each creamery, cheese factory condensary and shipping station to render on or before a certain date a statement, under oath, as to the amount of milk and butterfat bought during the previous year. Then they should be made to pay into the state treasury .0004 cents for each pound of butterfat purchased, counting 100 pounds of milk as four pounds of butterfat, the sum thus raised being made available to the commissioner of agriculture for the purposes of creamery inspection.

A tax of this kind, being levied upon all buyers would place all upon an equal basis. It is my opinion that the value of the dairy products of the state would be raised by the inspection service which this money would enable us to give, so that our milk, cream, butter and cheese would bring enough higher price to more than meet the expenses. The effects of this inspection too would be cumulative. There would be a gradual improvement in the quality of our dairy products and we could say in a short time to the world that Vermont had put its own house in order and was able to guarantee to the world dairy products produced under good clean conditions.

TUESDAY EVENING SESSION.

The evening session was in charge of the Vermont Jersey Cattle Club, George T. Chaffee of Rutland, President presiding.

At the close of the session the club held its annual meeting. During the evening music was furnished by Lessor's orchestra.

"Love and the Jersey", a picture film, the property of the American Jersey Cattle Club was shown.

"Making over an old farm house" (illustrated) was the subject of an interesting and practical talk given by F. F. Showers of DeLavan, Wisconsin. This matter is covered by a paper written by Mrs. Showers and published by the University of Wisconsin, College of Agriculture, and follows.

MODERNIZING AN OLD FARM HOUSE.

MRS. F. F. SHOWERS, DELAVAN, WISCONSIN.

Some friends were bidding a lighthouse keeper and his wife "good-bye". One of them said "I will send you some more magazines as I did last year." Immediately the wife spoke up and said "Do not cut out the advertisements; I will gladly pay the extra expense. By reading and studying the advertisements we derive much pleasure from them, besides keeping in touch with much of the progress of the world."

This reading and studying advertisements has helped us in making over the old farm home and installing many of the modern conveniences enjoyed by our friends in the city. We have sought to make our home as pleasant and comfortable as possible so that it shall not be simply a lodging house in which we live while we make money to buy more land to feed more cattle and hogs, to buy more land and feed still more cattle and hogs.

The farmer, without whom no other class of society could exist, seemingly thinks the least of home comforts, wife, and children. All are thought of in relation to how much and in what way they will increase the revenue of the farm. I said to a farmer recently, "Why don't you put such comforts into your home instead of continually expending more money to make your horses, hogs, and cattle more comfortable and sanitary"? He answered, "The house does not bring in money", as though all we lived for was the mere possession of money!

One cannot pick up a farm paper without reading an account of a corn-growing contest, a fat-stock show, or a poultry show, and noting the prizes offered for the best results attained. All of these tend to stimulate the boys and girls to become more interested in the farms and not to be satisfied with anything but the best. These contests are commendable and are serving to educate our boys and girls by placing before them tangible standards they may seek to secure. This education causes them to be dissatisfied with their previous attainments, and the result is progress. The boy sees the result of the carefully selected seed, the painstaking preparation of the seed bed made possible by some piece of machinery he is not in possession of, and

the result is new seed and new machinery. You think you see the immediate result of this added expenditure of money but how about your daughter? You may be giving her the Domestic Science Course in the high school, but are you willing to spend the same amount of money for her to put into operation the knowledge she has acquired?

Co-operation is the key word of to-day. The wife has co-operated with the husband from the beginning of time. It is high time the husband co-operated with his wife and daughters. Now, this co-operation is not as costly as it may seem. When I give you the figures on the cost of installing the modern conveniences we have in our home I am sure you will agree with me that many can afford to expend the amount, when the results are taken into consideration. Get together, study your conditions, and you will be surprised with the amount of pleasure you derive from planning and re-arranging your home.

I should like to suggest that you give your farm some suitable and appropriate name, a name by which it will be recognized not only in that immediate locality but a name that will mean something to future generations. We have named our farm "The Manx", in honor of my father who was born on the Isle of Man.

The stones for the porch of the house,—which is ten feet wide and fifty feet around the outer wall,—were taken from the pasture. The floor on the porch is cement and slopes toward either corner, where drains are located. I wish to call your attention to the number and height of the windows of the house, which provide health-giving air and light. The chimney is built in the center of the house from the cellar bottom. It contains three independent flues from the basement to the top, one for the furnace and one each for the two fireplaces. The cesspool is situated in the lot; the windmill, which pumps the water and air for the large pressure tank in the basement is located at the corner of the barn. A self regulating device is attached to the mill so that when the pressure in the tank reaches sixty pounds a lever is forced upwards and starts to throw the mill out of gear; by the time the pressure has been increased to eighty pounds the mill is entirely out of gear and remains so until we draw water enough to reduce the pressure in the tank when the mill is again thrown in gear. A thirty barrel galvanized tank is located in the hay mow of the barn into which is conducted the soft water from the eaves of the barn. The water from this tank is conveyed to the house through a one and a half inch pipe, and furnishes sufficient water for the summer months. During the win-

ter months the soft water is obtained from a large cistern, the connection with which I shall explain later. there are cement walks leading from the front and side porches to the driveway and also to the barn.

The supply pipe is tapped near the barn and supplies water in the barn. The pressure tank supplies water for the basement, kitchen and bathroom on the second floor, besides furnishing power to run the lift pump and supplying water for lawn and garden. The hot air pipes of the furnace open directly into the shafts above the furnace so that there are no side pipes excepting the one running to the kitchen. The vegetable cellar opens directly from the furnace room and has an opening into one of the flues of the chimney so as to carry off all foul odors.

We have a gasoline gas machine which furnishes gas for lighting the house and barn and for the cooking of all our meals. The Carburator, which will hold two barrels of gasoline, is buried in the ground outside of the house. The shell holds about eight hundred pounds of sand and by its weight unwinds a fan or pump which drives the air out to the carburetor where it becomes saturated and returns to the mixer where it is further diluted with air before passing through the riser to all parts of the house and barn. In the corner of the laundry is the pressure gauge, lift pump and pressure tank connected with the cistern. The connection with the lift pump is cut off in the summer months as we have had plenty of soft water from the tank in the barn. By means of this lift pump and pressure tank the pressure in the soft water pipes is the same as that in the hard water pipes and does away with waiting for the lift pump to work.

Directly above the laundry and connected by a stairway is the kitchen. On one side of the landing is the refrigerator and on the other side a wood box. These are both filled from the outside of the house. All of the floors on the first floor are hard maple, either waxed or oiled, and covered with rugs.

The kitchen is painted in white enamel and the walls are covered with white oil cloth paper in tile design. In this kitchen is a large center table with a sink in one corner, above which is the hard water faucet and the hot and cold soft water faucets. The table is 58 x 38 inches and stands 33 inches from the floor. The sink is 18 x 34 inches. With the help of a board which I can slide over the sink, I can increase the size of my table. At the end of the table is a large drawer for kitchen knives, forks, spoons, etc. This room has three windows and a door containing

a window. There are built-in cupboards and flour and bread bins, all out of the way of dust. The gas range in the corner of the room is like any city gas range and furnishes sufficient heat for the serving of twenty or thirty people. The hot water tank is heated during the winter months by the furnace which has a coil of one and a half inch and one inch pipe connected directly with the tank. The tank furnishes sufficient heat for the kitchen, and we found the water hot enough to attach a radiator in the living room, thus adding much to the comfort of the room and saving on the fuel bill.

The dining room opens from the kitchen and also has openings into the living room and parlor. In this room is one of the home-made fireplaces. A form was made on the floor of this room and into it was poured the cement in which was embedded woven wire for reinforcement. In the cement the chips, taken from the stones in building the front porch, were stuck. This was allowed to dry for five days; after which it was placed in position. There is another fireplace similar to this and directly back of it in the parlor.

In the corner of the dining room is a built-in china closet and sideboard, with cupboard below. Directly behind the china closet is a built-in book case in the living room.

Opening out of the kitchen is the back stairway leading to the bedroom; this is finished in white, the same as the kitchen. We also have the three kinds of water in the faucets over the lavatory. Opening into the same hall into which the bathroom opens is the den or library from which room there is an outside door opening onto an upper porch for airing bedding and shaking rugs. There is a long hall connecting these rooms with the front hall into which the bedrooms open and which also leads to the front stairway and to the reception hall below.

These, briefly enumerated, are the mechanical devices about which pages might be written in describing the conveniences they make possible, to say nothing of the sanitation. I know those who are employed in the kitchen noticed the location of the table in the center of the room and its proximity to the gas range and built-in cupboards. It is also sanitary, as there are no openings and corners between sink and adjoining walls for the accumulation of dust. Woodwork and walls, being in white enamel, are easily kept clean. Having all kinds and plenty of water directly above the sink does away with lifting and carrying of the water pails and garbage cans. The gas light directly

above the table makes it impossible to get into your own shadow. The gas range needs but the lighted match, and the drudgery of carrying wood in, lighting and keeping up the fire, and carrying out the ashes is done away with. I shall here answer a question I know will arise, and that is the cost of fuel and light with this system. Our bill from July 3, 1911 to July 3, 1912 was fifty-two dollars, or one dollar a week for all cooking, baking and lighting of the house and barn. Compare this with the time spent in getting up wood for the kitchen stove or the cost of coal, or will those in the city compare these figures with their gas and electric light bills.

The bathroom has appealed to more rural visitors at our home than has any other room in the house. Those of you who have come in from the hay field on a hot summer day or have come from a dusty, dirty threshing job would know how to appreciate this room. Here you have hot or cold water as you wish, or soft or hard water to meet your fancy.

The laundry is equipped with movable tubs, and hot water is to be had at all times when the furnace is being used. When the furnace is not in use a fire in the laundry stove supplies us with good hot water. Here the washing is away from the living rooms, and the steam is drawn up the flues of the main chimney, which does away with steam all over the house. The sink in the laundry is connected with the sewer pipes leading to the cesspool, thus carrying off all waste water from the laundry. The last and most important is the bill of expense for installing these conveniences:

Light and gas fixtures, including gas machine, all piping, gas stove and all fixtures.....	\$262.47
Pressure tank, thirty barrel tank in barn, dig- ing of trench from windmill to house, pump at mill, piping, laundry, bathroom and kitchen equipments complete	295.00
Installation of furnace with all pipes and re- gisters	135.00
Two fireplaces, including grates, tile, cement and labor	31.50
	<u>\$723.97</u>

I know you will agree with me when I say the farm home can be made as convenient as any city home at a much less expense of upkeep. Come to "The Manx" and see how simple and convenient these appliances make the so-called drudgery of farm life.

COW TESTING ASSOCIATION SESSION.**WEDNESDAY MORNING.**

**FAILURES AND SUCCESSES IN COW-TESTING
WORK.**

**EDWARD VAN ALSTYNE, ALBANY, NEW YORK,
DIRECTOR N. Y. FARMERS INSTITUTES.**

It is natural for most of us when we start out in any undertaking to look for the successes. A good many years ago when I was a young man, I was appointed one of a committee of three—and I was the youngest of the three—to go into Massachusetts, to investigate into co-operative creameries and bring back a report to our people. One of the first creameries we visited we found had been running six or eight months, everything was lovely and the older men of the committee said "This is very satisfactory, we have seen enough, we will go back home". That did not seem quite right to me and I said, "No, let's go on to the next place and investigate some that have been running longer and see what we find there." But their counsel prevailed and we went back. We started in with success in our minds but we had not run a year before we struck failures and we struck enough of them so that we went into bankruptcy. If we had been willing to have investigated more extensively and have found what the difficulties were the chances are we would not have failed. That is true in any endeavor. It is fine for young men starting out in life to have enthusiasm and to look for success but I want to say at the same time you should look for the difficulties that are ahead because they are there and if one arranges to meet them they are more liable to overcome them rather than be overcome by them.

I am not here to make a speech, in fact I am not an orator but "a plain man that talks right on" and this morn-

ing I want to talk in a conversational sort of way and give you as I may be able a little sketch of just what my subject implies,—failures and successes in Cow Test Association work.

Our first work of this kind began in 1908; with an association that was started near the College of Agriculture at Ithaca fostered by the school and it lives to this day, a very good Association and yet I imagine it would not have survived had it not been wet-nursed by the University. The following year there was an Association started in the Dairy County of Delaware. In 1912 we had all together in the state thirteen associations, so that you can see that our growth to 52 associations has been largely in the last two years.

Commissioner Pearson was the man who started the associations through the Department of Agriculture and while he gave much help in organization he also did something that proved to be a serious mistake,—in sections where they were somewhat scattered and not very well off financially he gave them financial help in starting their association, say \$100 or \$200 a year. This is what happened,—there was not a single one of those associations which we helped financially that lived three years. When we started carrying these associations financially they did not develop internal strength and they died. That was one of the mistakes. Then we started a campaign through the Farmers' Institutes of telling in the dairy sections the virtues of Cow Test Associations. That work has "blossomed and brought forth fruit abundantly." One should not be discouraged by the day of small things; our tendency is to want to see the end from the beginning. I remember twenty-five years ago when one of the large companies started to exhibit at the State Institutes a cream separator, the first one that the majority of people had seen; it excited a good deal of interest. When the spring came and the season of exhibition was done I asked the young man who exhibited the separator how he had succeeded, and he said his company was very much disappointed because they had not sold any separators. I asked him if he expected to make large sales at first and he said "Yes"; I told him that he had no reason to expect any such thing, that the separator was an entirely new thing and was expensive and that they could not expect farmers to purchase them then. You all know now the extent to which the separators are used. It is safe to say the enormous sale of them never would have been accomplished had it not been for the preliminary work similar to that I have just told you of. So

it is with our work; bye-and-bye we get a request from some section saying that they are interested in the Cow Test proposition and asking us to come up and help them organize. We do a large amount of missionary work along this line; a large number come to the altar and are saved dairy-wise through the medium of the Cow Test Association work and I am frank to say that a good many have been saved in the enthusiasm of a popular revival, without thinking very much of the future, and their stay is short. In 1913 we had about a dozen associations scattered throughout the state and we experienced two serious difficulties, one was when we organized with a board of officers, they did not know very much about their duties and were not much interested,—they were scattered over a very wide territory. A poor tester was another trouble, but as we had no standard we had to take such material as was to be had and that material was not always good; sometimes the tester was efficient as far as his business methods were concerned and very inefficient as to his morals. The first requisite of a tester to-day is that he should have a good moral character.

It is a great deal easier to start a new enterprise in a community than it is to revive an old one, and in a community where an association has lost interest and gone back it is a difficult proposition indeed. We have some of that kind now where there ought to be associations but we cannot organize until a new generation comes to the front.

Then another difficulty was up to 1913 all our associations were organized on the dollar a cow plan. That was your plan and it was a good one we thought and we followed your lead. It seemed to be an equitable basis that every man that had a cow should pay a dollar a head,—and in that way the large dairies pay much and the small ones little but we found it did not work. The men were continually changing cows; one time a man had twenty-five and the next time only eighteen. In this way you see it made a very unsatisfactory foundation for the tester to work on; he never knew for sure what he was going to get, and the money was sometimes paid and other times not. Since 1913 all our associations have been organized on the two dollar a day plan, the owner signs a contract whereby he pays the tester two dollars a day for the time he works,—we don't ask a tester to take care of more than thirty-five cows a day,—and the owner must assist in the test if there are more. If an owner has a large enough herd to occupy two days then he pays two dollars for each two days' work. In case two neighbors are located in close proximity they

can divide the work if they choose but it is all on a basis of the two dollar a day plan. The tester knows in this way what his compensation is to be and we find that it is much more satisfactory.

At first with us there was no official head for the Cow Test Association work; it was under the Commissioner of Agriculture and at best he could only give it "absent treatment." In the fall of 1914 the work was put in my hands; having been for sometime interested in it previous to this I conceived the plan of dividing the state into districts and putting a man in charge of each district to organize and look after the associations in that district. This was more or less expensive. Then came the Farm Bureaus and at once I said "There is the solution of that proposition, there is the local dairy manager on the ground, it is his business to look after the test association; we will help them organize but after they are organized it will be understood that it is his work to look after the Association." That worked very well especially when we got a live dairyman as a Farm Bureau manager who could reason logically. When we got another fellow who wasn't as much interested in dairying as in farm crops, perhaps not very anxious to magnify his duties he was not as satisfactory. We found in one County three associations had "gone by the board" in a month because the manager was slack. So three years ago at a meeting in Ithaca that matter was discussed and the sympathy of the Vice-Director of Farm Bureaus aroused and through his aid we started an entirely different plan, an entire reorganization of the whole association business. In the first place we renamed it and now we call the same "The Dairy Improvement Association" throughout our state instead of Cow Test Association. It means more than simply weighing and testing the milk; it means all that has been connected with it. After we re-baptized it we made a contract in black and white. I have some forms I will be glad to send you if you will advise me at my address; in fact, I will be glad to forward our bulletin on Dairy Improvement Association work in New York State upon request. We draw up a contract between the Farm Bureau manager, the president of the Dairy Improvement Association, the tester (whom we call the Dairy Demonstration Agent) and myself. That contract defines the duties of each one. We claim, and our claims are justified by the results, that the simple signing and filling in of these contracts has a good influence if nothing more is done. Among other things it says that the Farm Bureau manager shall have charge of the work in his community

and that the members of the Association and dairy agents shall be amenable first to him.

We have established a standard for testers and for four years I have had a man who has been attending our school of Agriculture at Alfred as instructor, training men for this purpose and these are some of our very best fellows. Other schools in greater or less degrees are training men for this special work so that now we can be quite sure when we get a man from these classes that we know pretty near what he is going to do. We have a line on his character, on his activities and his ability. I have a list in my office and when these names come in I get all the data on them I can and as applications are received from Farm Bureau managers for a tester, I know where to refer them.

Another thing that we make these men do is to look after the books,—all the financial aid they have is being furnished with record books and everything of that sort is furnished by the Department of Agriculture and they sometimes become the nucleus of an association. But before we furnish any books the contract properly signed has got to be filed in my office. We have had a great deal of difficulty in getting the books footed up; formerly they were sent to our office for that purpose and it was well nigh impossible to get that done with the large amount of clerical work that occupied the time of the force. It was often a long time before the work was done and the books returned; If a man did not get his book back until three months after his year was completed he did not much care whether he did the work another year or not. Why should he? So we made this arrangement that instead of organizing with twenty-six herds we would occupy but twenty-four days and two days of every month would be spent in the Farm Bureau manager's office footing up records, bringing the testers there once a month. There is a lot in mutual contact. Who pays for those two days? Either the associations out of the treasury or they are paid by the Farm Bureau Association. Now those books are going back to the members regularly, either every month or quarterly. As you know, there is an increasing interest in advanced registry work among the leading dairy breeds. I had hoped that I had made arrangements whereby any of the associations would accept the work of our testers so long as it was carefully done, but unfortunately that fell through. We find there are a great many men, poor men but interested in their work who will be glad to test their cows for A. R. record if they could do it without too much expense; but to pay the expense of a man for a day

or two to come from the central point at the university to do this work runs into money pretty fast. You can readily see if that work can be done in the associations and done just as carefully there will be a great many men who will do the A. R. work. The man I am interested in is the man that is dairying for a livelihood. I am interested to meet socially and otherwise the millioraire farmer but I don't feel like lying awake all night trying to figure out problems for him. The man I am interested in, as I said before, is the man who has to get his money out of his cows with which to buy shoes for his children; if I can help him to test his cows and keep an official record, then I feel I am doing something that will help society. We found this, that the Ayrshire Cattle Association and the American Jersey Cattle Club would accept the records of our testers authenticated by one of the heads of our secondary schools. We have several herds—and their numbers are increasing in these two breeds—who are doing official work through our agent, and we feel we have them hedged in to such an extent that the work is just as carefully guarded as that authenticated at the college. In the other two societies—the Guernsey and the Holstein they have not seen wise up to this time to depart from the prescribed rule of having the record authenticated at the college and they do not accept the schools' work.

We have also what we call a Register of Honor where either pure breds or grades can have official records made for them by a tester to whom I issue a certificate to do this work. This is in every way similar to that of the A. R. work and is approved by an annual visit from one of my representatives, the records being on file in the Department of Agriculture. Many are taking advantage of this work.

I have tried to outline to you in a very imperfect way the steps by which we have gone, the failures which have retarded us,—though out of these failures successes have come. We feel to-day with our fifty-two associations thoroughly organized—by the way no tester can do advanced registry work unless he has from me a special certificate indicating his fitness for that work—and with about thirteen hundred members and between twenty-six and twenty-seven thousand cows that we are on a fair road to benefit the dairy industry of this State. In what I have given I acknowledge myself in your debt for as I give I receive and I hope to go back to New York with new ideas and new incentives, new thoughts and new inspiration. If we can do that it has been well for each that we came together.

BREEDING AS A FACTOR IN DAIRY PRODUCTION.

PROF. GEO. F. E. STORY, DEPT. OF ANIMAL HUSBANDRY
EXPERIMENT STATION, BURLINGTON, VT.

Breeding as a factor in dairy production meets with too little interest by Dairymen in general. This condition is probably due to the fact that most of our dairymen have several sources of income and therefore do not insist upon the maximum efficiency of their herd. Intensive dairying does not always mean that good breeding is practiced for in the case of the milk producers near the large cities, calves are seldom raised. When I refer to the milk producer I mean the man who is interested in getting the greatest number of quarts of milk from a given number of cows. He is not interested in the breeding of his animals. If they do not give the number of quarts of milk per day that he thinks they should, they are either sent to the butcher or sold to some man with a trusting disposition who thinks he can get them to give a bit more milk. Other cows that have been shipped into the locality many without doubt discarded by members of some cow test association are purchased to replace them.

The problem of breeding better cattle is of great interest at the present time, because without a doubt the cheapened production or the increased efficiency of our herds will be brought about more completely in the next ten years by breeding than any other method we have at our command.

Feeding is of deep interest to the dairyman; I say that fifty per cent of the men of this association are feeding at the present time more than the cattle actually require for the amount of milk their records indicate they receive.

We should have in mind the better feeding methods which have been taught by people from this platform so thoroughly in years past, people familiar with all phases of the subject, but we have gotten, I believe, to the point where rapid improvement will not be made through feeding methods. In fact figures show that many men are feeding more than their cows theroretically require, in other words wasting feed on poor cows. Don't misunderstand me to say that there are no people who could feed more efficiently and more satisfactorily. I mean that at the present time

with the high prices which are current, it matters far less what you feed than it did two years ago when prices were more normal. It is doubtful if any man can make up a cheap ration at the present time; it is out of the question to feed cheaply. You can throw together almost anything that will not injure the cow but the price will be above two dollars per hundred, one feed may be less expensive than another but neither is cheap.

That feeding alone is not our salvation is indicated by the low production of milk. It was said last night that the production in Vermont was between 4200 and 4300 pounds per cow. We know of associations that will average around 6,000 pounds, possibly more; but we also know that even in the best associations there are herds that are woefully lacking in uniformity of milk production. I heartily agree with Mr. Van Alstyne in the fact that if there is anything that brings discouragement to a man it is a herd either pure bred or scrub without any particular value.

Whenever we speak of "pure bred" immediately there comes to our minds the value of pure bred animals and the expense incidental to the establishment of a pure bred herd. As a matter of fact there are only two or three percent of pure bred dairy cows in the country, and the men who are interested sufficiently in pure bred stock to develop valuable animals and go to years of study to determine what is the right sort of pedigrees to combine are well able to care for themselves and they do not require the encouragement that the man does who is making his first decision to purchase a pure bred sire. Pure bred cows are not essential for high production, pure bred bulls are. We need to put at the head of our herds not only a pure bred but a good individual. The almost immediate change one gets in conformation, type and uniformity of production as a result of the use of a pure bred sire is remarkable. Even with a herd of mixed colors, shapes and production possibilities, if you place at the head a sire of strong prepotency it is possible to change the whole color, conformation and milk production in one or two generations. My attention was once called to a mixed herd where in five years they were able to build this herd over into one of uniform color and type (I refer now to a Holstein herd), a type of animal that resembled a pure bred and splendid type of dairy animal that would sell on the Brighton market for from one hundred twenty-five to one hundred fifty dollars. The owner had changed this nondescript herd to a type which would command these very good grade prices and had brought the average production of his herd up to a point

that was equal to the record of the highest producing cow five years before. The only outlay to this owner had been the purchase of pure bred animals of merit to head the herd.

In a herd of Guernseys the owner increased the fat content of the daughters from one half to one and one half percent over that of the dams, and every one of them resembled pure bred Guernseys in color and conformation.

One of the finest herds of Jerseys I ever saw was a herd of grades that had been improved for twenty years by the use of pure bred sires.

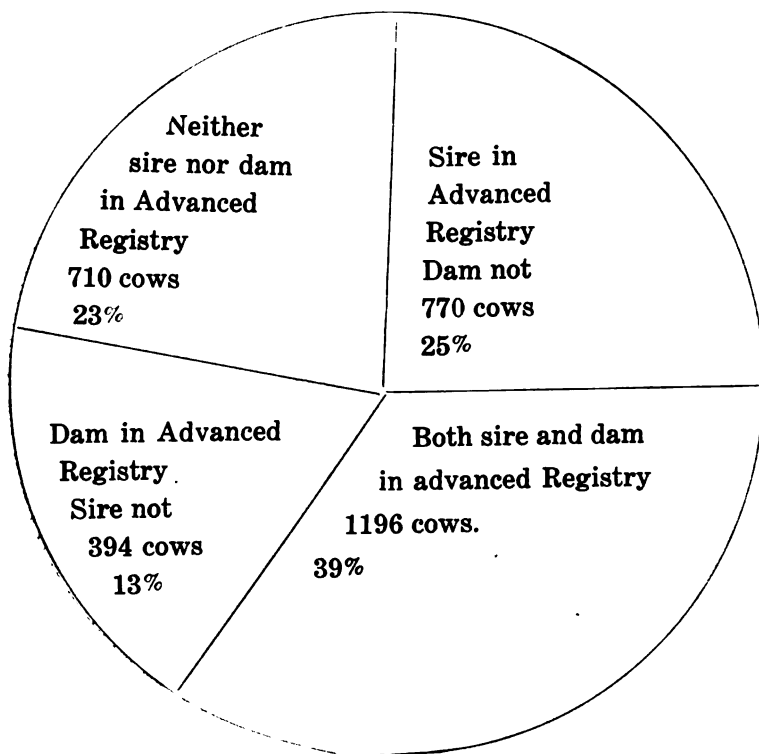
These examples indicate that the same possibilities exist with grade stock and the same principles hold true in the development of grade stock, that is true with pure bred. A man who buys pure bred and feels his work is done has a whole lot coming to him,—not in money but in experience. It requires a great deal of study, and a great deal of time looking into ancestry and attempting to find the animals that are fit to be bred in order to bring out and correct certain weaknesses that may exist.

What are the elements we have to consider in developing our herds, or in making use of these principles? We might say that the first one we have to consider is the advanced registry work. If we are going to choose an animal from productive ancestry that is going to exert an effect on our herd we must give credence only to authentic records. I am not saying that many of the private records are not authentic reliable, but in many cases a man's imagination gets the best of his pencil and he gets out records which are extremely readable. The Record Associations which carefully supervise all of the records that are made and which insist upon these records being reliable have given us the greatest foundation for our dairy development work that the world has ever known. Probably through no other method would it have been possible to select and list such a number of high producing animals as are found in the advanced registry work of the breed associations.

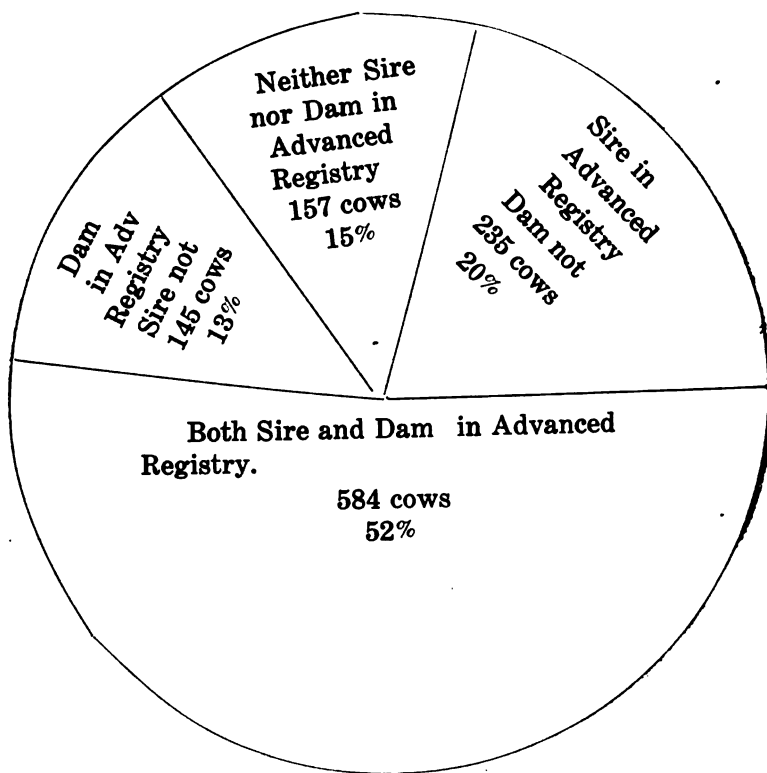
The charts which I will show you at this time are based on official Holstein records and were compiled by Professor Wing of Cornell University.

CHARTS

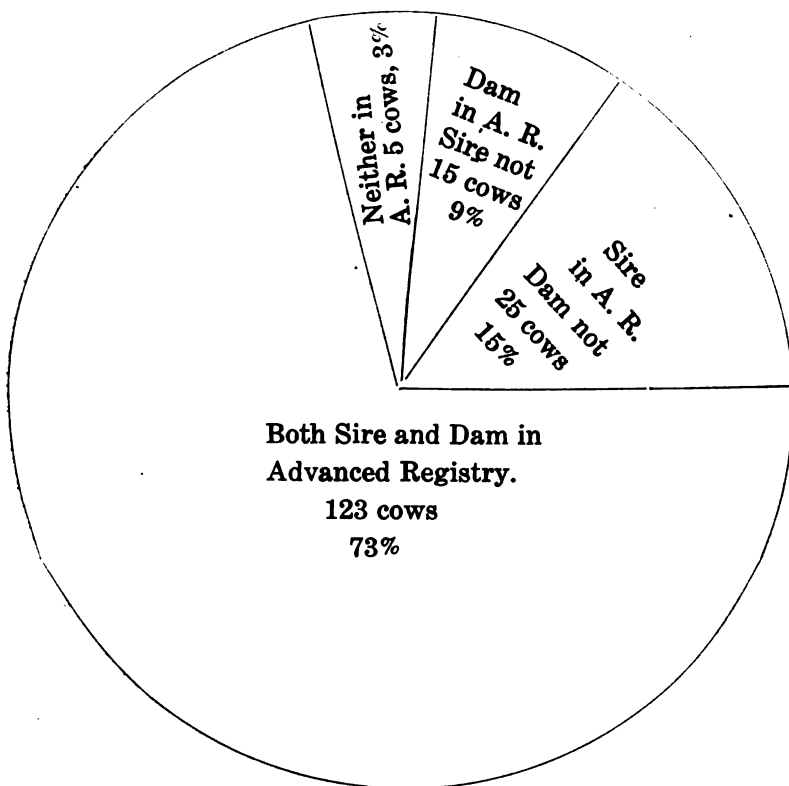
Holstein cows making ordinary Advanced Registry Records
Basis of 3070 cows.



Holstein cows exceeding requirements by 100%.
Basis of 168 cows.



Holstein cows exceeding requirements by 50%.
Basis of 1121 cows.



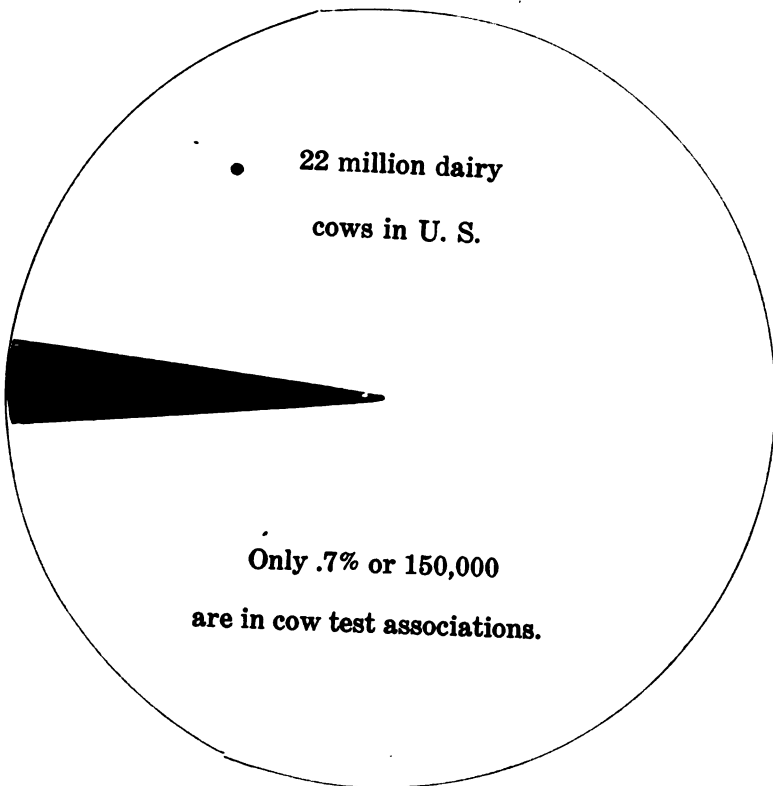
The dominant idea of the charts, is, that the better the breeding stock the greater will be the chance of securing good offspring. Even with carefully selected stock poor animals often result, but the percentage of good ones is greatly in favor of the animals with good backing.

Cow testing association records are a close second to the Advanced Registry system as a means of determining the value of dairy cows. The method of conducting these

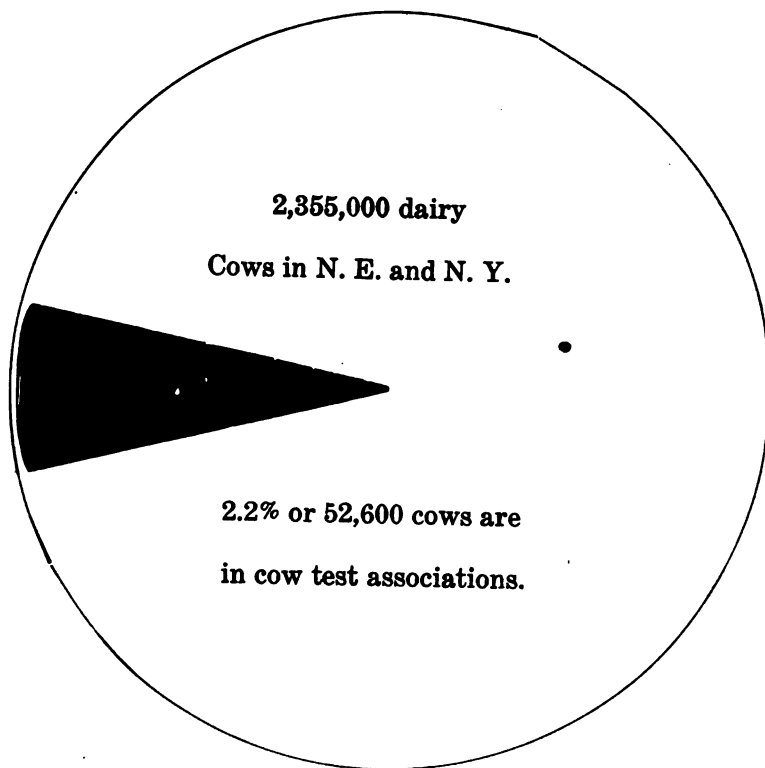
associations is so familiar to all present, that no time will be taken explaining their merits. It may be interesting to note, however, that as great as the benefits of cow testing associations are, less than one per cent of the cows in the country are regularly tested in this manner.

The following charts show graphically the present status of the movement.

Black area shows number of cows in cow test associations in United States.



**Black area shows number of cows in cow test associations
in New England and New York.**



It will seem that while New England and New York, have three times as large a percentage of cows regularly tested as the United States as a whole, we are still backward in weeding out our poor cows. Having determined which cows are to be retained in the herd our success in improving them depends upon our ability to select a sire that will mate well with the herd.

Some of the points to consider in selecting a sire follow:

1. Get a pure bred animal; the calves are more uniform and typy.
2. Select a strain of known merit, both as to individuality and production.
3. Choose from ancestry that is strong in points where your herd is weak.
4. Select a breed which is popular in your locality.

Continue to select sires of uniform type, from good ancestry and you will be surprised to see how quickly the herd will improve. As interest in better stock is awakened, a few pure bred animals should be secured for a foundation herd.

In closing I wish to urge the members of this association to do all in their power to banish the scrub bull from the State of Vermont and thereby help to make this the most profitable state in the Union.

WEDNESDAY AFTERNOON SESSION.**SOME FUNDAMENTALS IN SUCCESSFUL DAIRYING.**

**EDWARD VAN ALSTYNE, KINDERHOOK, N. Y., DIRECTOR
OF FARMERS' INSTITUTES.**

In order to have correct ideas on any subject, we must know the underlying facts, and from them reason logically. In order to do this we must dismiss from our minds all prejudice and previously formed opinions, accepting facts as they are, not as we thought they were, nor as we should like to have them.

When I was up in Maine a few years ago, an old man living in the back country was asked, "What do you do in winter when the snow shuts you in"? He replied, "Sometimes we set and think, and sometimes we just set." While the latter does not certainly tend to mental development, I believe in the end that it is better than to think crookedly.

One of the great needs of the present day is for men to think straight, namely, first to get bottom facts, and then to draw logical conclusions from them.

My purpose to-day is to set in order before you some facts, easily to be apprehended by any unbiased mind. If we agree as to these we should be able to arrive at the same conclusions, even though they are at variance with what may have been our previous ideas. To "set and think" that we are the victims of the monopoly working against heavy handicaps, ignoring actual facts, will not only do us harm, but will take away a desire for the individual effort always fundamental for success.

Were we to take at face value all the statements in the agricultural press and from the lips of those with good intent, but whose mental processes stop too soon, we should be constrained to believe that most dairymen were on the road to bankruptcy. How can it be otherwise when apparently expenses far exceed receipts? These are not wilful misstatements, but half-true statements, more harmful than downright lies. We know that it is rare for a

dairyman to be sold out. In most cases they are paying for and improving their farms, educating their children, and bringing into their lives at least a degree of present-day necessities. In these estimates all manner of costs are piled up on the old cow, while, in reality, it is impossible to set her on a pinnacle independent of the rest of the farm. She is part of the farm equipment; in many cases without her the farm could not possibly be run.

I shall divide what I have to say under four heads:

1st. Profit from the farm crops marketed through the cow.

2. Increased value from the farm because of manure returned to the land.

3. Direct money profit.

4. The effect on the man.

PROFIT FROM CROPS.

In many cases this is the only profit for the dairy, and, while it is too small, it is not to be ignored. One of the most prominent and successful of New Hampshire's Dairymen told the speaker that when his hundred-cow dairy paid the interest and depreciation on the capital invested in them, paid for the labor, purchased feed, and returned for the large amount of farm products they consumed a price sufficient to allow a fair income from the land, he was doing as well as the average business man. Many New York State dairymen are doing the same thing, but do not appreciate it.

Take the item of pasture. On many farms such land would be utterly valueless without stock—we shall not stop to consider the question of whether in some cases animals other than dairy cows could not be profitably substituted, for we are now dealing only with the dairy—yet this pasture is charged against the cow, and no credit is given the farm; yet, without the channel of the dairy to turn it into cash, there would be no income whatever from this source.

To a degree the same is true of hay and forage. True a man who sells his hay to his dairy at a less price than he could obtain for it at the station after expenses are paid, is not a good business man nor a good dairyman, and he needs a cow-testing association to help him weed out unprofitable cows. On the other hand, to charge such hay to the cow at the gross market price and then charge against her the labor of feeding it—which is less than it would be to put it on the

wagon for market—is unfair to the cow. Often clover hay and mixed grasses find their only profitable market through the medium of the dairy. For cornstalks, bean fodder, straw, and silage corn, there is no outside market without the aid of the cow to turn this very raw material into a finished cash product. These are large items on most farms. It is both customary and correct to figure silage corn at one-third the price of timothy hay. This year on that basis silage is worth from three to four dollars a ton. A conservative yield of ten tons an acre returns fifty dollars to the farm. Silage is a profitable crop at \$30 an acre. What would I do this year with my thirty acres of silage corn without my dairy to turn it into cash? Why then pile all these costs on the cow, when she is the factor that makes it impossible to operate the whole farm at a profit? This naturally brings me to my second head.

PROFIT FROM MANURE.

At the outset I wish to state clearly two facts, the first being that it does not follow in logical sequence that a dairy farm must increase in fertility. Alas, it is too true that I can point out many that in spite of having had dairies on them for at least a generation are not increasing in production. This is the fault of the management, not of the dairy—reasons I cannot take up; let it be sufficient to say, however, that such cases are the exception, not the rule. The second fact I wish to emphasize is this: Because the owner fails to use manure from his dairy to the best advantage, it is as unfair to fail to give the cow full credit for it as it would be to fail to give her credit for butter fat lost through poor skimming or churning.

There are always two values to a fertilizer of any sort—the commercial value, based on the cost of the ingredients, and the agricultural value, based on its power to grow crops. The two are seldom the same; the former may be much more or less than the latter. What is the value of the voidings of a dairy cow for a year? The average dairy cow will void—liquid and solid—about sixty pounds daily, or almost eleven tons a year. At \$2 a ton, a fair average commercial price for the nitrogen, phosphoric acid, and potash that it contains, the value would amount to \$22 annually. At present war prices for such ingredients, these values might be double. Fully 50 per cent of the plant food is in the liquid, most of which is often wasted. While it is impossible to save it all, I am very certain, if the

time and energy expended in tirades against milk handlers were put forth in an intelligent effort to save and properly utilize this by-product, the results would be much more satisfactory to the pockets of the dairyman. Without attempting to discuss the methods of using the above economically, I would say that any good farmer can retain 75 per cent of the commercial value of his manure. The agricultural value of manure is usually more than the commercial, as evidenced by the results obtained from manure that has lost at least half of its plant food. Considering its humus-making content and its ability to increase materially that of the sod to which it is applied, and its value as a breeding place for soil bacteria, I am certain it is within the truth to say that the increased agricultural value will fully over-balance the loss in plant food when the manure is handled according to present intelligent methods. A profit, then, of at least \$20 a cow annually from increased fertility is not to be despised. That this has a financial, not an artificial, value, is evident by a comparison of the selling from which crops only have been sold, for farm values price of dairy farms and those of the same character must fundamentally be based on production.

It is interesting to listen to the voluntary testimony of the blacksmith-shop philosopher, when the production of some local farm is discussed: "Wall, no wonder, he has always kep a big lot of cows."

It is evident that a man whose cows have paid their costs, who has profitably marketed a goodly amount of farm produce, and annually turned \$20 of fertilizer for each cow to the land, need not fear the sheriff and is doing as good a business as the average merchant. Nevertheless, the man who is satisfied with the above is not possessed with the ambition necessary to achieve the highest attainment.

MONEY PROFITS.

Having emphasized the fact that in many cases that which has enabled the dairyman to pay for his farm and to educate his children has come from profit on crops through the cow and from more certain and increased production, I now turn to the rather difficult proposition of considering a direct money profit to the dairyman. Naturally, one's first thought is profit from an increased price. I am a dairyman with from forty to fifty milch cows. On them I depend to a large degree for the necessary income. I realize full well that the margin of profits is not so large as it should be, considering the capital and labor invested. No

one would more gladly welcome an advance in price than I. Such advance has come during the years, but always contemporary with an increased cost of production or of better quality. I can see no reason why different conditions should exist in the future.

We cannot ignore the fact that in the last analysis, values are based on the law of supply and demand. Many have tried, but no one has ever succeeded in maintaining a corner on any of the world's great staples in the face of a large production. This is particularly true of a perishable product such as milk. If the large handlers were able to obtain a supply always commensurate with their daily needs, the price could be materially increased. In view of the variable supply, they must have a surplus, which, when not needed for consumption as milk, must be turned into manufactured articles. For the major part of the year there was fully as much milk offered as the market needs. When the surplus was turned into butter and cheese, we are competing with the whole world. The great North-West and a large portion of Canada is dotted with creameries and cheese factories, the product of which both quickly and cheaply reaches our great Eastern Centers. In normal times the price of these commodities is effected by the price in the English market. These are supplied from Canada, Denmark, and Australia. The problem is therefore a complex one. The first step then, to obtain an increased price for milk in our great cities is to regulate the quantity shipped by local control of the surplus.

It is true, the consumer obtains more real food value in milk than in almost any other article he buys, and for this reason the consumption might be largely increased. A few years ago an attempt was made on the part of the large handlers to raise the price in New York City. This was met by an onslaught from the daily press, charging extortion, which resulted in a decreased consumption; a surplus quickly accumulated and the old price was restored. It is asserted that the large handlers are receiving more than their share of the profits. The investigation made by Attorney-General O'Malley in New York State for the year 1910 showed that profit came from the volume of business, not from a large margin per quart. Certain it is that most of the time, there has been a supply ample for daily requirements. With the price raised a cent and more a quart, without providing for control of the surplus, within less than twelve months there will be such an increase in production that the surplus will compel a reduction in price below that at present obtained. Dairymen will feed more

liberally, will put on more cows, and many grain farmers will go into dairying because the business would be profitable. It is a law of trade that no business can for a long period return a profit beyond the average. Witness the fruit business to-day.

As an illustration let me call your attention to conditions existing a few years ago. I chanced to be in a large milk station on the day in March when prices were given out for the next six months. They were from five to ten cents a hundred-weight lower than those paid the same month the previous year. I asked why this reduction, with labor as high and feed higher, and the same retail price for milk. I received no adequate reply, but the answer was this: The winter had been favorable for milk production. Cows were coming out satisfactorily. Apparently they could obtain all the milk they needed at the reduced price. Why, then, pay a higher price and stimulate an increased product that they did not want? Surely, a good business reason. What followed? April and May justified their forecast. By June there was a lack of rainfall; pastures began to fail. By July 1, there was a shortage; by the latter part of the month, milk was so scarce as to command a premium. In August the handlers voluntarily increased the price thirty cents a hundred. In early September prices were sent out for the six months beginning with October, which were higher than had ever before been paid.

Philanthropy? No, business. The supply was far below the demand. It now paid to make milk. Men began to feed and, wherever possible, to enlarge their herds. The increase naturally was not at once apparent. The fall was one of abundant rainfall. Pastures were never better, holding out to the latter part of November. The corn crop was a large one, and feed dropped in price two dollars a ton. By January 1, there was more milk than the market knew what to do with; in March, butter was selling for June prices. Not a few small dealers failed. All natural conditions readily repeated. I realize this is not pleasing. I wish it were not true, but it is much better for us to look the facts in the face than to beguile ourselves with sophistry.

What I have to suggest is old. If we are to make a direct money profit, we must do it with a smaller number of cows and better ones, and these more intelligently fed, thus making a profit at present prices, and being in a position to make a still larger one if the longed-for day of high prices comes—that day for which so many prophets have

"longed for and died without sight." The purpose of the cow testing associations is to assist in doing just this thing.

Direct money profit may also come through an increased price for a better article. By that I mean milk from healthy cows, produced and handled under sanitary conditions, and containing a guaranteed amount of butter fat. Such milk can be produced by any man of moderate means in inexpensive stables. From personal experience, I can testify that after one's herd has been freed from tuberculosis, thus eliminating diseased, barren, and hence unprofitable cows, one can produce milk more cheaply than from a herd where disease exists. No one practice will do more to free the herds of the state from this disease than the pasteurization of skim milk and whey, much of which, coming from cows whose milk contains the bacilli of tuberculosis, is a source of infection to all animals fed therefrom.

Those producing milk other than that class as "Grade A" will always compete in the market best supplied, and consequently will receive the lowest price. There are, and will be, an increasing number of people who are willing to pay an increased price for a superior article. Milk of this character produced under common sense—not dude—conditions will yield a margin of profit beyond the increased cost of production.

EFFECT ON THE MAN.

By no means least in importance is the effect on the man of associating with well bred cattle, properly housed, and of sending out a product of which he is not ashamed. If I am able to impress on you the importance of this point the others will follow as a matter of course. If a dairy man is merely keeping cows, without regard to their character, or that of their product, his work is drudgery, and he is "of all men most miserable". When we can come to appreciate that we are dealing with soil and plant life to feed the animal, and that next to man this animal is one of the highest forms of life, all of which are capable of great development, and that by this development we are working hand in hand with God Almighty, our work will take on a dignity undreamed of before, and it will be possible for us not to make the best of the soil, plants, and animals and of ourselves as well. We shall come to the enlarged vision that will cause us to appreciate that every dollar of real profit is that which shall give to us and ours a more abundant life.

A man whose soil, intelligently handled, produces at its best; a man who has well bred, healthy stock, comfortably stabled, whose product he is willing to acknowledge anywhere, is bound to respect himself and to command the respect of his associates, to a degree impossible to him who is satisfied with the minimum of production in either plants or animals, or whose association is with scrub stock kept in unsanitary stables—stock whose product would scarcely be accepted in the markets, —for, of necessity, we all partake and become a part of our environment.

PROBLEMS IN MARKET MILK PRODUCTION.

C. B. LANE, PHILADELPHIA, PA., SCIENTIFIC DEPT., SUPPLY DAIRY COMPANY.

I assure you I deem it an honor and a pleasure to again attend one of your annual meetings after a lapse of some ten years. When I was in the Government service I travelled a great deal through the various states, but since I have been engaged in business it has been more difficult to get away. I was born and brought up in New England (Connecticut) and always feel very much at home here in spite of the rocks, the blizzards and winter almost the year round, which many people object to. But when those people farther to the south, who make fun of New England winters, want to take a vacation, where do they go? Why they come up here to Maine, New Hampshire and Vermont. Speaking of the New England rocks they are certainly a disadvantage when it comes to cultivating the soil. Down in our part of the country last summer they were using tractors to do their work in the field. And they are verily a gasoline wonder on wheels. It does nearly everything that a horse can do and a lot of things that a horse can't do, which would make the horse burst into tears with shame and humiliation. It pulls the plow cutting three furrows at a time; it pulls the mower and the reaper and the binder and the cultivator; it will run the wood saw, pump water, shell corn, cut ensilage, haul logs, draw the produce to market and if the automobile breaks down it will take the family to church. In plowing it almost operates itself. One man plowing with a tractor jumped off his seat and told the "doggone" thing to plow along the side of a hill by itself, and the tractor obeyed and not only that it plowed at the rate of three miles an hour keeping in the furrow without human hand touching a lever. You couldn't do that on many farms in New England. Where I was born it took three men to keep the plow in the ground.

The farmers to-day, whether in Vermont or Pennsylvania or Kansas are taking a more prominent place in affairs than ever before, and the public is looking upon him in a different light. Now and then you will find a farmer like the one discovered within 35 miles of the city hall, Toronto, the other day who did not know that a

war was in progress, but as a rule the "hay-seed" is fading from view rapidly and his place is being taken by keen business men who apply science to their work. The farmer also sees himself in a different light and is beginning to reveal his power. Let the Government send out an estimate of a bumper wheat crop and the railroad and all business begins to make ready for the increasing demand and the pulse of trade is quickened all along the line. The farmer is studying soil chemistry and soil bacteriology, making seed selections and practicing intensive cropping systems; as a result his acres are yielding more and better products and at a smaller cost of money and labor. Great progress is being made in all farm problems. The man of to-morrow will accomplish more in less time than his predecessors. Present methods and present tools won't do. Like the man with the tractor plow, we have all got to have bigger and better and faster machines. Science has developed a cow (Johanna De Kol Von Beer) that produced 30,000 lbs. of milk in a year. Seed corn scientifically produced sells at a corn show for \$10.00 an ear and farmers are raising alfalfa yielding five tons of hay to the acre instead of one ton of timothy in the old fashioned way. This is the new spirit of the farm.

NEW ENGLAND PROBLEMS.

You dairy farmers here in Vermont have many things to your credit. For example, the Boston Chamber of Commerce published a statement a short time ago that *Vermont was the biggest dairy state in New England*. That means I presume that you produced the most dairy products. I also noted in this same report that in the recent investigation of the dairy industry of New England that *more accurate figures were furnished* by the dairymen of Vermont relative to the cost of producing milk, feeds, etc., than by the farmers of any other New England state. Further there are more cow test associations (34) in the State of Vermont than in any other New England State, and I presume Dr. Hills of your Experiment Station is largely responsible for this, together with the fact that you dairymen were foresighted enough to see their value.

Those things are all good but there are other things which you will agree with me can be improved upon. For example this report stated further that *only about 20% of your dairy farmers have silos*. Can that be possible? Why if I was going into the dairy business the first money

I spent would be for a silo. I will not take time to discuss the reasons why. You know them as well as I do. I will simply say that the silo is one of the greatest money savers on the farm from the standpoint of labor, feed, waste and cost of milk production. Again, while as I have said *some farmers had a fair idea of a number of important factors* affecting the cost of production on the farm the farmers in general had no accurate knowledge. It was clear also from this standpoint that there are *many cows in New England producing less than 3500 lbs. of milk a year* and most of them from 3500 to 4000. The average for Vermont being a little less than 4000. How can you make any money on this basis? This is not the fault of too low a price for milk, although I do not say you are getting enough, this is clearly your fault and you should correct it. I suspect that some of you are better at producing maple sugar than you are at producing milk. This report showed that *over 80% of the farmers had no accurate idea of the amount of milk each cow produced in a year or the percentage of fat in the milk.* The cow test associations are rapidly changing this. Another statement showed that the average farmer produces from 50 to 200 tons of hay and only a small percentage of it could be sold as No. 1. Whose fault is that? Many barns are used not only in stabling cows, but for horses, hens, tools, hay and grain. Some of the farmers had all this charged up to the cows but of course this was unfair as the cows should be charged only what it would cost to build a cow stable to house them.

THE PROBLEM OF SOIL FERTILITY.

With the above brief review of the dairy conditions in New England, let us discuss for a moment the reason why we are in the dairy business or why dairying is the most essential form of agriculture. Did you ever stop to think that the dairy cow is the only animal in the world that can return large profits on high priced land. We have good examples of this on the islands of Jersey and Guernsey, where land is worth \$400 an acre and in Denmark and Holland where it is worth from \$400 to \$800 an acre. Yet dairying is the principal business in these countries and it is the dairy cow that is making these farms rich. Dairying certainly has a financial advantage in these parts of the world and it is also true in our own country. History has shown that the keeping of live stock on the farm and success in farming go hand in hand. The profits from agriculture in almost every country increase and decrease

with the increase and decrease of live stock kept. In the last United States Census the profits per acre in the different states rose and fell with the live stock values in those states. We are safe in concluding therefore that those results so uniformly invariable cannot be the outcome of accident. The effects are produced by certain causes always operative in dairy sections. *Any system of farming must result in the removal of fertility from the soil, but dairy farming properly conducted results in the removal of a minimum amount of these elements and provides for the physical as well as the fertile character of the soil and may be regarded as constructive rather than destructive.* For example, it has been estimated that the fertility in 100 acres of fertile soil is worth \$10,000. A wheat crop would remove from 100 acres in 20 years \$10,000 worth of fertility. On the other hand a herd of 18 cows in 20 years would restore \$10,000 worth of fertility. This herd would not only support the crops to feed themselves, but additional fields of 20 acres of corn and 14 acres of wheat where milk is sold. To illustrate in a more practical way, land on the Pacific coast has been reduced to such poverty by the continual raising of wheat that it produced only eight or nine bushels per acre; has been restored by dairying so that it now produces from 30 to 40 bushels and the land has doubled in value. A farm of 2500 acres in Illinois has been planted in corn for 10 years and now fails to return a profit; as a result the owners are now going into dairying and will stock the farm with a thousand cows in order to restore the fertility. The corn growing was like drawing the principal deposited in the bank until all is gone while dairying permits a man to live on the interest.

THE PROBLEMS OF FARM MANAGEMENT.

"Farm Management" or "How to Run a Farm" is one of the live questions at the present time and to me it appears to be a very important one. *In Wisconsin they had a contest on farm management in which 150 farmers entered and the lessons the farmers learned there are the same lessons we need to learn here in New England and in every State in the Union. While it may be confusing to attempt to comprehend the true relationship of each operation, on the farm, yet there is much to be learned from a study of this sort. There is the question of adjusting the labor and the number of horses to the work to be done, so there will be no waste of time and none overworked. It is quite generally believed that a large farm is necessary if a good profit is*

to be made. There was nothing in the results of the 150 farms that indicated that the size of the farm measured in acres is fundamental to profitable farming. *The ten most profitable farms contained on an average 180, the poorest ten 185 and the average 170 acres. One of the most profitable farms contained only 80 acres and one of the poorest over 300.* The incomes from the farms after 5% interest had been deducted on the investment were as follows:

N. of farms	Manager's income per farm.
4	\$4000 to \$5000
4	3000 to 4000
24	2000 to 3000
36	1000 to 2000
38	500 to 1000
22	500 to 100
20	Loss 100 to 800

One important point brought out by these figures is the direct relation between the number of cows kept and the profits. On the best ten farms 24 cows were kept, on the average 17 cows and the poorest 10 farms 11 cows. The results also showed that the farmers growing the greatest acreage of alfalfa received the largest returns from their farms. *Now let us look into this money investment a little closer.* Everyone knows that it requires capital to own and operate a farm. Now in order to study these farm operations we will divide the capital into fixed and operating. Fixed capital is the investment in land, buildings, etc. Operating capital includes investments in cattle, horses, machinery, etc. Farm economists have held that many dairy farmers do not keep cows enough and that a greater profit would be made by keeping more cows. These results seem to substantiate this belief. In other words if you are in the dairy business keep cows enough to make it a business and not play with dairying. *It was shown in this investigation that the farmers with the highest percentage of working capital, that is with the most cows, made the most money. The average investment in the 10 best farms was \$34,494, of which \$9,825 was operating capital or 27.77%. The average investment of the 150 farms \$21,825, of which \$4,950 was operating capital or 22.6%. And the poorest 10 farms had an average investment of \$25,091 of which \$5,474 was operating capital or 21.8%. It was found that where the operating capital was only 12 to 15% there was practically no income for the manager. But when 25 to 35% of the*

total investment was operating capital then a good income was obtained for the manager. *Each farmer in the contest was given a statement of the results obtained on his own farm*; in this way he was brought face to face with his conditions and was able to see his strong and weak points. For example, one farmer found that he had too much good land in pasture, so he plowed up part of it and materially improved his income. Another discovered he was keeping too many horses for his work so he sold two and did his work just as well and greatly reduced the cost. The following score card was used by the Farm Contest Committee as a guide in selecting the prize winning farms.

	Points
Manager's income or profits,	50
Maintenance of Fertility	20
Home life	20
Health of herd	5
General appearance of farm	5
Total	100

You will notice that only 50 points are given to net profits or the money side of farming. I was glad to see this because it teaches that making money is not all there is to successful farming. the home, its conveniences, its beauties and opportunities for life; the soil, its conservation to future generations in its fertility and vigor; the appearance of the farm and sanitary conditions of herd and family; all are factors in successful farming. I like to see a farmer point with as much pride to his house conveniences as he does to the barn and farm conveniences. When farmers get to talking this way they are on the right track and are developing agriculture of the highest class. Sometimes we are so wrapped up in our routine work that we get a narrow view of things; we need to have expert judges look us over and criticise us and score us up once in a while. I would like to see every State have a farm contest of this sort.

THE PROBLEM OF WHAT CROPS TO GROW.

A study of the cropping systems of New England, or most any other State for that matter, shows that the farmers need to grow more silage corn, more clover or alfalfa and if his land is suited to it, some grain feed, which might be soy beans, oats or barley. This would mean the bringing more waste land under cultivation, more men and teams would be used, more fertilizer would be purchased, more

operating capital would be used and the business of the farm would be increased. Many farmers seem to prefer to do what they can themselves and let the rest go. There seems to be, however, no easy way to cut off the grain bill, so we must go at it hard. The results, I believe, will fully repay any dairy farmer who has got the grit to go at it. Let me give you an illustration which I have seen myself. The Walker-Gordon Co. in New Jersey, which keeps several hundred cows at one time, purchased practically all of their hay from Canada and paid \$3.50 per ton duty and \$3.50 more for transportation, the total price delivered to their railroad station being about \$15.00 per ton. only about one half of the cost, therefore, went to the producer. So they decided that they should be able to produce hay as cheap as anybody and save the duty and transportation. The plan worked and they are now raising 2000 tons of alfalfa hay a year on about 500 acres. This is enough to feed their herd of several hundred in New Jersey and Massachusetts and the saving of freight rates alone is sufficient to pay a fair dividend on the capital stock of the company. They are now seeding land to alfalfa in Massachusetts with good prospects of success. If our farms were up to limit of their production this feed situation would be very different than it is at the present time and we would be producing all the hay we wanted and at the same time reduce our grain bill. Timothy hay and feed store combinations of grain may be the easy way, but it is leading many a milk shipper to certain failure.

Let me give one more illustration showing the importance of growing the feed for our cows on our own farms and selecting the crops that are most profitable. This was in Illinois but applies equally well in Vermont. Four farms of 160 acres each were used for the experiments which required eight years. (The buildings took up two acres). The soil was equally productive on each farm and the cows of equal efficiency. Each farm was divided into eight equal plots, in order to carry out the rotation systems. No outside feed was purchased for either farm. The rotations for each system were as follows:

System	1st Yr.	2d Yr.	3d Yr.	4th Yr.	5th Yr.	6th Yr.	7th Yr.	8th Yr.
No. 1	corn	oats	corn	oats	timothy	pasture	pasture	pasture
" 2	corn	corn	corn	oats	clover	timothy and clover	pasture	pasture
" 3	corn	corn	corn	oats	clover	alfalfa	pasture	pasture
" 4	corn	corn	corn	corn	corn	alfalfa	alfalfa	alfalfa

The comparison to be made shows what one going into the dairy business may reasonably expect to accomplish from each of these systems. The results are based on the production of milk per acre which generally speaking is the final test for profitable dairying when all feeds are grown on the farm.

System	Pounds digestible nutrients	Number of cows supported	Lbs. of milk per acre	Profit
No. 1	245,182	38	991	\$ 243
No. 2	322,350	51	1447	780
No. 3	379,126	65	2025	1947
No. 4	617,730	100	3150	3928

Now what do we learn from these results?

1. The intensive methods of the 4th system which provides for the growth of the herd crops, corn and alfalfa, return 16 times the profit of the 1st.

2. That a dairy farm, even though the milk is all sold from it may be conducted so as to make not only a permanent agriculture but an *accumulative agriculture* which at the same time is remunerative. *In the first system the fertility of the farm was diminished*, there being an annual loss of 1900 lbs. of nitrogen, the 2nd and 3rd and 4th showing an increase in nitrogen of 110, 2280 and 5,830 lbs. respectively.

3. That the increase in fertility is due entirely to the kind of crops raised and their adaptibility to the feeding of dairy cows.

4. *That the protein contained in a crop commonly raised on a dairy farm is far too low and store feeds have to be purchased to make up this deficiency.* For example, an acre of timothy hay does not contain more than one tenth as much protein as an acre of alfalfa hay. System No. 4 produced three times as much protein and 2 1-2 times as much total nutrients as system No. 1.

5. The ration in system No. 1 consisted of 14 lbs. corn stover (8 lbs. eaten) 5.5 lbs. timothy; 9.5 lbs. corn meal 6.5 lbs. oats; nutritive ration 1:9.8. System No. 4 consisted of 40 lbs. silage and 13.5 lbs. alfalfa hay. Nutritive ratio 1:5.9.

Is it not worth while to consider cropping systems that show such a difference in the returns and in the maintenance of the soil? And the farmer who complains that he is not making a profit should examine his methods and see

whether the trouble is not with himself rather than the price he receives for his product.

PROBLEMS CONNECTED WITH THE DAIRY HERD.

Perhaps the hardest problem in connection with the dairy herd is to keep the average production up to a high standard. Of the 21 million cows in the United States three million are being kept at a loss, due to low production. This subject you will say is an "old saw" but nevertheless this defect cuts deeply into the dairyman's profits and must be remedied if we are to get the most out of our business. The cow test associations are doing this work well but not fast enough. Just one or two illustrations on this point. In an investigation made a little time ago one dairyman was found who had been milking 9 cows twice a day for 6 months or 360 times and they figured out that he had made five cents, the price of a cigar, and a poor one at that. This was not the fault of the cows for they were not to blame, it was not the fault of the market for his neighbors made money; it was not the fault of the feed for the farmer selected it. It was the fault of the farmer himself who was not awake to his opportunities. And this is usually the way with any business that doesn't pay. It is not the fault of the business but the man who runs it. Did you ever try to pick out the best cow in your herd? Well if you can do it you ought to get into the judges' ring at the National Dairy Show. I knew of a father and son who had been milking a herd for several years and thought they knew all about their cows, and they were asked at the beginning of the year to go over the herd and use their combined judgment and put down the six best cows. This is the way they came out. The best cow was 5th on their list and the second best cow was not on their merit list at all. Another illustration, those of you who were at the Dairy Show last fall saw in the Missouri Exhibit a chart headed "it pays to test your cow." This chart gave the result of weighing and testing for three years the milk of two purebred Jersey cows that were half sisters and that received the same kind of feed and care. *One produced an annual profit over feed cost of \$170, the other profit of \$82.50.* Such displays make us sit up and take notice that the cow is an individual and that the only court that can give a fair and impartial verdict for both cow and owner is the one that requires the scales, the fat test, the milk record and the feed cost. All cows should be brought into such a court for the purpose of showing whether their

standing is sufficient to keep them in good cow society. A poor cow is like an extravagant wife—she costs more to keep than she is worth.

THE PROBLEM OF KEEPING THE HERD HEALTHY.

When we speak of the health of the herd the first thing that comes to our mind is tuberculosis, which is the most devastating plague with which dairymen have to contend. The United States Government after testing a half million cows came to the conclusion that about ten percent. of all cows in the country were infected. In our State of Pennsylvania about 15 percent. are infected and I presume you have about the same percentage in Vermont. There is no longer any question about its transmission to the human family and the experts claim that from six to ten percent of all tuberculous children got their disease from the bovine source. Calves and pigs are also readily infected, when fed milk from tuberculous cows. It was found that about 16% of the milk delivered in New York City a short time ago contained tubercular germs, the samples being collected indiscriminately. Considering these facts, I am sure that you will agree with me that no dairy farmer can afford to have tuberculosis in his herd. A herd suffering from disease cannot yield as great a profit to its owner as a healthy herd. The Government estimates that the loss in lower production amounts to about 10%. Besides the dollar and cent side of the question, there must be considered, of course, the rights of those who consume dairy products. No argument can be brought in favor of selling milk from a diseased herd even though the danger of contracting disease may be small. All intelligent live stock men know what they should do but not all of them have the courage to meet the situation. Even when they have reason to believe that a large number of their animals are suffering from tuberculosis they hesitate because they fear the consequences. There are some, however, who have the wisdom and courage to act and meet the situation when it arises. Let me give one instance. A Holstein breeder in Ohio suspected his herd had tuberculosis. He noticed some of his best cows were running down in flesh and would not respond to good feeding as they had in previous years. He called upon the Bureau of Animal Industry at Washington to send a competent Veterinarian to apply the tuberculin test to his cattle. The test was made and 23 out of 24 reacted. Slaughter followed and upon examination all were found to have tuberculosis; 14 were so bad they were fit

only for fertilizer. After the herd was slaughtered the owner said, "I am glad, I would do it right over." We cannot hope to eradicate tuberculosis from all our stock until we look upon every diseased cow as a menace to the herd, and like the Ohio breeder, can comprehend the losses sustained through this disease and until we have the courage to act for our best interests.

Just a word about my own experience with tuberculosis. As I have already said in our state of Pennsylvania, about 15% percent. of our cows are tuberculous. About eight years ago the Supplee Milk Company of Philadelphia, with whom I am connected, conducted a tuberculosis campaign with the idea of cleansing the herds, in a section of Chester County, from this disease and keeping them free from it so far as possible. I had charge of this work and with the aid of some State veterinarians, tested over 1000 cows the first year and found 18% diseased. Over 200 cows were sent to the slaughter house. The cows tested the first year, with others, have been tested every year since and we are able now to keep the number of diseased cows below two percent. and one year it was only one percent. This shows what can be done if an effort is really made to stamp out tuberculosis. Of course, the farmers are careful not to buy cows that have not been tested and they still take a great interest in the work and insist that their cows be tested every year. We are always very careful to see that all stables are thoroughly disinfected after animals have been found diseased and removed. Because testing is of little value if the stable still harbors the disease. Tuberculosis is a germ disease and contagious like measles or scarlet fever in the human family, and the germs must be destroyed to stop its spreading.

THE PROBLEM OF PRODUCING CLEAN MILK.

For ordinary purposes we understand clean milk to be milk from healthy cows, milk that is free from dirt and milk that contains a small number of bacteria, none of which are of a disease producing nature. If, however, milk was absolutely clean it would never sour. They have some milk in a sealed tube at the Michigan Agricultural College that is fifteen years old and is still sweet. Simply "clean milk". But it is not necessary or practical to produce that kind of milk. Another illustration of clean milk production is the Walker-Gordon farm down in Jersey, which ships milk to Russia, Panama, Palm Beach, Montreal and many steamships leaving New York for foreign countries are

supplied with Walker-Gordon Milk for the voyage out and sometimes for the return voyages as well. Walker-Gordon cream has been used in Japan after a five weeks' tour in an automobile and found to be perfectly sweet. Another illustration; the Supplee Milk Company shipped milk to the Panama exposition in San Francisco last summer, a trip of 3000 miles in the hottest June weather, yet the milk was perfectly sweet when examined by the judges, two weeks later, and was awarded the gold medal on a score of 97. Only one germ was found on the bacteriologist's plate. *All these illustrations simply show the possibilities in milk production.* This clean milk problem means a fight against the germ from whatever source it may come; a fight against the fly, a single one of which may carry a million bacteria; *a fight against unclean milking*, for it has been shown that a farmer may carry 45 million germs on his hands, 98% of which may be removed by washing; *a fight against unclean cows*, which are the source of 70% of the germs in milk, *a fight against unclean utensils* which harbor millions of germs in cracks and corners; *a fight against typhoid fever*, scarlet fever and tuberculosis which get into milk when it is not properly safeguarded; a fight against every unclean condition in the handling of milk. (Ill. the boy who swore.) What are we going to do with these little plants that get into the milk so easily and multiply so rapidly? A single one increasing to 75,000 in 24 hours under favorable conditions. The best thing to do is to keep them out of the milk as far as possible. *The use of a small top milk pail makes it possible to keep out 97%, in a poor stable and 85% in a good stable; again if we do our milking before feeding the cows their grain, we can keep out 30%; if we do the milking before we handle dry corn stover in the stable we reduce the bacteria 66%; if we wipe the udder and flanks with a damp cloth before milking we may diminish the count 77%; if you have a milker that jerks the cow's udder while milking he will have 90% more bacteria than the careful milker and so we could multiply these precautions indefinitely.*

After the milking is done and we have taken a reasonable amount of pains, then the next thing to do is to cool the milk quickly and stop the germs growing. Some kind of tubercular cooler is best, but if you cool it in the can stir it frequently and you will cool it in just one half the time than if it isn't stirred.

Then about those utensils, some dairymen you and I have seen take a pail of hot water and put it from one pail to another and when they are all through they will tell you they have sterilized the pails, but have they? Tests that

have been made show that when even boiling water is left in a milk pail for a minute the temperature will drop to 167°, when poured into the second pail and held there for the same length of time 147°; and to a third 127°; this kind of washing does not sterilize.

I grant you that with superior care the dairyman should have some financial incentive to keep it up. And many milk dealers are doing this in Philadelphia. And I understand this is also true in Boston. We are paying a premium for tuberculin tested milk, for milk with bacteria below 75,000, for milk that is shown to be clean by the filter test and for dairies scoring 68 or above. The results are most remarkable and show that the average farmer is willing to be careful and painstaking, provided he is paid for it.

If we are going to solve the problems, therefore, and compete with the man of to-morrow, we must have faster machines, better management, better cropping system, better cows, better care of our products and this all means more profit.

CLEAN MILK FOR VERMONT USE.

DR. CHAS. F. DALTON.

Dr. Chas. F. Dalton as Secretary of Vermont Board of Health addressed the convention briefly in a plea to the citizens of the State to assist in securing clean milk for use in Vermont. He spoke as follows:

Mr. President and Ladies and Gentlemen:

You have considered the question of milk shipped to New York and Boston and also milk made into butter. I come to you to appeal to you as citizens of Vermont to help us secure clean milk for our own state.

While we are thinking of the babies and invalids of the great cities, we must not forget that our best crop in Vermont is the baby crop and these babies have to be protected also. And this does not mean that just because they are Vermont babies, every one has a father who takes care of the cow himself.

The problem of milk supply in our larger cities and towns is a very difficult one. As you know, this part of the milk business is in the hands of the State Board of Health and the work is done through local health officers. I am willing to agree, however, that this method of inspection and licensing is not altogether satisfactory. Local friendships, local jealousies, and, possibly, local politics, are all apt to have their influence in the local licensing of dairies.

Realizing this fact, the State Board of Health obtained permission from the Governor to have a state inspector for market milk during the past summer months. We went to Dean Hills and Prof. Story and asked them to select a man for us. They chose one of their dairy students, a practical man, brought up on a farm, and thoroughly acquainted with the work. I want to tell you some of the results which he reported after working during the summer.

The total number of dairies inspected and scored was 429, located in ten counties. He used the regular score card of the United States Department of Agriculture, as we have no other at the present time. On this basis, the

average score of all these 429 dairies was 61.9%. divided as follows:

Equipment	21.11
Method	41.79

The percentage of these dairies scoring

between 40 and 50%	was 13
between 50 and 60%	was 30
between 60 and 70%	was 33
between 70 and 80%	was 15
Over 80, only	4%

and 2% of the dairies scored below 40%.

Mr. Van Alstyne said this afternoon in his address that he considered a man criminal who would knowingly dispense the germs of tuberculosis in milk. I do not suppose that any of our farmers are doing this knowingly, but many are apparently doing it ignorantly for of these 429 dairies inspected, only 27 had had the tuberculin test within a year and only 3% at a time, thus only 30% had ever been tested.

On the condition of the barn yard, with liberal scoring, 45% were pronounced O. K. 19% poor, and 35% bad.

Removal of manure to any proper pit or fifty feet from the barn 24.6%. Those having no pit of any description and not removing the manure, 75.6%. The previous speaker has told you in detail about the benefits of the small-top milk pail. It was found in this inspection that only 11.6% of the dairies were using small-top milk pails. Another important point is shown by the item of cleanliness of milking. The dairies in which the udders of the cows were washed before milking were 3.7%. Those wiped with a moist cloth, 13.5; those brushed dry either with the hand or a cloth, or anything convenient, 82.8.

In the matter of milk room, those having any kind of a milk room were given credit and amounted to 53.6%. Those having no milk room of any description were 46.4%.

The result of all this is that the samples of milk taken and examined in the laboratory showed 57.7% clean and 42.3% dirty. You will notice, then, that the points on which we are deficient and which could be easily remedied are:

Conditions of barnyard,
removal of manure,
small-top milk pail,
cleanliness of milk and
tuberculin test.

I am sure that it is asking no hardships when we say that these things ought to be remedied.

I have already written to the Commissioner of Agriculture saying that we would be willing to place this inspection under his department if thought best. If, however, the law remains as it is at the present time, it is our hope and intention to make the position of milk inspector a permanent one and have all the dairies of the state supplying milk to our towns and cities inspected at least twice a year by the state inspector. This would leave the licensing in the hands of the local board of health, but the licensing would be conditioned on state inspection.

I, therefore, ask your co-operation and assistance in our attempt to clean up the milk which is being supplied to our own citizens of Vermont.

I am sure that your Association would have a great influence if you would take action on this subject and I am also sure that it would be appreciated. You will also be shown the appreciation which counts, viz., an advanced price for milk. The people are learning the value of clean milk and they are learning the danger of dirty milk. The price of milk has been raised in Burlington this winter and I have heard no complaint whatsoever. The same thing could be done in other places so that improvement could be made in the quality of the product. Let us all work together for this purpose and thereby, not only help to uplift the milk industry but advance the cause of public health.

I thank you.

REPORT OF SECRETARY AND TREASURER.

December 1, 1916.

Cash on hand, December 1, 1915,	\$ 463.93
Annual appropriation,	1,000.00
Received from exhibitors for space in Machinery Hall and for advertisements in program and annual report.....	380.50
Membership fees, 1916,	90.00
	<hr/>
Total receipts	\$1,934.43

EXPENDED AS FOLLOWS:

Capital City Press, programs	\$ 100.00
Opinion press, printing	34.00
Lessor's Orchestra,	45.00
Orrin Bent,	55.00
M. J. Pauluson, picture machine,	15.00
Joe Mitchell Chappel, speaker,	70.00
R. S. Seeds, speaker,	113.00
Charles E. North, speaker,	70.50
Van Ness House,	192.46
Mrs. L. Bickford, Auxiliary	5.00
W. G. Reynolds Company, chairs,	19.10
F. H. Bickford, Secretary and expense, 1915,	230.88
G. M. Putnam, speaker,	41.88
Red 46 Furniture Company, chairs,	6.00
W. H. Harrington, butter room and expenses	24.93
W. B. Bullock,	5.09
Free Press Association,	3.50
Boston Chamber Commerce per J. C. Orcutt, speaker,	20.94
G. F. Warren, speaker,	76.10
M. A. Adams, services at Convention and expenses	25.15
Miss G. S. Smith, reporter,	56.30

W. N. Cady, part expenses at Boston meeting,	27.88	
M. A. Adams, services as treasurer, 1915,	10.00	
Opinion Press, printing,	14.50	
A. H. Peters, postmaster, stamps,	32.00	
W. H. Bullock,	1.35	
Mass. Agl. College, part expense at National show	24.86	
Bogle Bros., cups,	21.14	
Transferred to premium fund,	239.25	
		<hr/>
Total expense	\$1,580.86	
Balance on hand, December 1, 1916,	353.62	
		<hr/>
		\$1,934.48

PREMIUM FUND.

RECEIVED AS FOLLOWS.

Orrin Bent, contribution,	\$ 5.00	
525 pounds butter sold,	152.50	
Drawn from general fund to balance,	239.25	
		<hr/>
		\$ 396.75

EXPENDED.

Paid for 262½ points butter @ 1.50,	\$ 393.75	
Paid W. H. Wright, 10 pounds of butter, ..	3.00	
		<hr/>
		\$ 396.75

The report was accepted and adopted.

THE PROFITABLE FLOCK OF SHEEP FOR VERMONT.

O. L. MARTIN, PLAINFIELD, VT.

I don't know but I possess some temerity to stand here and talk on a subject that, so far as my knowledge goes, has not received one word of encouragement by the Agricultural Extension Service, by the Department of Agriculture, or by any other agricultural agency in the state for the past five years. I don't propose to give you an oration here on sheep growing; many old heads in the audience can give me "cards and spades" on sheep history in the State of Vermont; but having always been connected with the farm flock I know that there never has been, perhaps with the possible exception of one year, a time when a small flock of sheep has not paid a minor profit in connection with the other farm stock; so I think it best to give more or less an informal talk, presenting my figures and the figures showing the decline of the sheep industry in Vermont.

If you will notice by the chart here the palmy days of the sheep industry were around 1840. There is much that can be said regarding the sheep industry at that time. As you ride over the green hills of Vermont you will be attracted now and then by long low rambling barns that are silent monitors of the land of the golden hoof of 75 years ago. If you have never been to Chicago since the new Stock Yards Inn has been erected you do not know perhaps that in connection with this there is an exclusive building that is called the "Saddle and Sirloin Club." The walls of that club are adorned by the portraits of great men who have made history in connection with the beef breeds of cattle. If we were to erect such a club as that in Vermont the walls of the building would of necessity be adorned by the portraits of such men as the Hammonds, the Riches, the Saxons, the Bingham, who made Merino sheep history in the state of Vermont 75 years or more ago.

They tell me in the old days one of the chief grand occasions of the year on the Bingham farm was a sheep shearing, an annual event, at the close of which the barns would be cleared and a dance would follow,—a grand ball. Happy and proud indeed were the people who had an invitation and were included in that function. I will not attempt to tell the immense profits that accrued from the breeding

of fancy stock when individual animals sold as high as \$2,000 per head, because those are not prices that we can depend upon year in and year out; it is a sad commentary on the thrift of the generations of to-day that the sheep industry has been allowed to dwindle to 100,000 head in the State of Vermont when not many years ago we raised more sheep per capita in Shorham, Vermont, than any other like area in the United States.

At the last National Wool Growers' convention held in St. Louis there were 1200 people present, while the records show that in 1867, in Rutland County, at the annual sheep shearing contest there were 1000 people in attendance. So through all the history of the sheep industry, Vermont has had a foremost part up to within recent years.

I have gathered some figures that I present before you and I am reminded right here of the traveller who got off a train hurriedly at one of the railroad restaurants and rushed into the lunch counter and told the girl he wanted a sandwich and a piece of pie. The girl secured the two articles of food and at the same time asked "will you eat them or carry them with you"? The traveller answered "both". So I have prepared these figures for your consumption and I will be glad to have you carry them with you if you can make use of them.

This chart shows rapid decline of the sheep industry from

1840;	1,681,819;	1880;	439,870;	
1850;	1,014,122;	1890;	362,112;	
1860;	752,201;	1870;	580,347;	1916; 100,000.

Between '60 and '70 on account of the Civil War and the demand of the Government for army clothes the falling off was less than any other period in the 60 years. Probably between 1840 and '60 tariff troubles had something to do with the falling off, and again in the '80's and '90's tariff troubles largely were responsible for the cleaning up of the industry.

In this state there are hundreds and thousands of acres of land that are adapted primarily to the growing of sheep.

I would not stand here in this audience of dairymen advocating sheep growing in opposition to the dairy cow because it would be heresy. The dairy cow must stay on our Vermont farms but there is always a little land where the sheep can run that the dairy cow can not profitably use, and there is always a place around the barn that a small flock of sheep can be housed comfortably that would

not be suitable for the dairy cow, and it is in connection with the dairy rather than in opposition to it that I am advocating the keeping of this farm flock of sheep.

About a month ago it chanced to be my good fortune to be in attendance at the Maine Dairy Association Convention and there I heard a paper on sheep and the figures ran so close to my own experience I was bold enough to suggest to our secretary that someone be allowed to say a word to the members in defense of sheep at this meeting. I was amused by the statement of the speaker (an undertaker by profession) at the Maine meeting in which he said he had had a chance to buy a farm with a flock of sheep, and he had worked the flock up to its present condition and he gave an interesting account of his experience. At the close of his paper when the meeting was thrown open to discussion a physician arose and said he too had launched into the sheep business; that he wasn't an undertaker when he started in but could qualify in that profession at the end of one year. That is very likely to be the experience of one unless he posts himself thoroughly at the outset. We read a great deal about sheep living on nothing. That doctor undertook to put that method into effect and as he said he qualified as an undertaker by burying half his flock the first year. A flock of sheep will bring up an old pasture better than any other agency I know. We have a flock of 30 head; I calculate to keep them at that number; it is a good flock to handle; about a dozen of these are ewe lambs, that will not bear young the first year; then we have a breeding flock of about 24 head. I put them in the inventory at \$10 per head—I am not offering them for sale at that figure—but December 1, 1915 they were worth \$10 a head and I could have sold them for that. A sheep will eat between 2 and 3 pounds of hay per head per day; it depends upon the quality of the hay, whether coarse or fine. The man in Maine gave a fraction over 2 pounds. I have been very liberal in these figures, so no one could find any fault with them. Five and a half months is the extreme feeding period. Five and a half months at 3 pounds of hay per head per day will figure 496 pounds a head and that would figure for the flock $7\frac{1}{2}$ tons approximately; at \$12 per ton, which was the price last winter, would cost you \$90 for the wintering of your sheep. As to grain, I feed very little outside of the screenings from the threshing machine and the weed seeds will not bother you after they have been eaten by sheep, and the sheep will do well on the weeds if a few oats are thrown in with them. Salt I figure at 200 pounds, shearing 10 cents a head (I

might say also in connection with the occasion of the sheep shearing in Rutland County where about 1,000 people were present that they did not then realize that the second generation would find it difficult to find a shearer to take the fleeces from the sheep). Twine 60 cents, dip \$1.00. I have figured 15 days labor. That is more or less of an estimate,—probably half an hour a day would cover it with the exception of April when the lambs are coming. Pasture \$1.00 per head, which is rather high, but a good pasture is worth that at present for cows. This will give us a total expense of from \$158 to \$160.

That includes everything I now think of included in the expense and even that was practically all produced on the farm.

We have credited to the flock of sheep the wool. The fleeces would average $9\frac{1}{4}$ pounds per sheep, which is a good average— $277\frac{1}{2}$ pounds at 37 cents (which I may say is very low. I see the purchaser of my wool in the audience and I may say here that he will have to pay higher next year) so we only got 102.68 for our wool. Two barren sheep did not produce lambs and we took them to the slaughter house and received \$14.00 for them; 27 market lambs weighing $2,035\frac{1}{2}$ pounds at 8 cents (that is another time when I sold one cent less than a good many others, and 1 notice to-day New York market gives $14\frac{1}{2}$ cents a pound, so you see 8 cents is a very reasonable price) which brought \$162.85.

Five ewe lambs and three ewes picked out to keep my number down were sold for \$70, making in the aggregate \$349.53, or a net profit of $\$6.36\frac{1}{2}$ per head, or a profit on the flock of 190.93 and the percentage of profit of 63 plus on the flock.

I would like to ask the dairymen if they can offer a history of the dairy cow which produces the percentage of net profit as shown by the sheep on the same investment. In the meantime while I say I don't advocate the keeping of sheep in competition with the cow, yet any one who don't like to have the hired man thumb his nose at him and go away leaving the dairyman to milk his cows alone, he can displace those cows with sheep, can make a reasonable profit on his investment and doesn't have to invest a few hundred dollars in milking machines.

DISCUSSION.

Question: Have you had any trouble with dogs?

Mr. Martin: I never have had very much.

Question: What is the law in relation to killing dogs that worry sheep?

Mr. Martin: A man may shoot a dog caught worrying his sheep. I understand there will be some legislation presented to this General Assembly along this line.

Question: Do you find difficulty in getting your sheep sheared?

Mr. Martin: Yes and no; there are not many shearers; I have a neighbor who has a machine and I always prevailed upon him to do my work.

Question: How many lambs have you ever been able to raise from your flock of thirty sheep?

Mr. Martin: I think this year has been the banner year, 22 ewes giving me 39 lambs.

Question: How do you get along with your neighbors?

Mr. Martin: We are on speaking terms with all of them. It is a little difficult sometimes to get a fence that will hold sheep. I use a two or three foot woven wire fence on top of a wall and that will take care of them generally; I have never had trouble in that way.

Question: What breed of sheep do you raise?

Mr. Martin: Shropshire.

HOW TO MAKE A SMALL FARM PAY.

F. F. Showers of DeLavan, Wisconsin, a school teacher for twenty-three years, is farming a forty acre farm with wonderful success. He has a herd of cows that made him a profit of twelve dollars a head in a year; he gave an interesting history of his work, and among other things said:

Love and enjoy your work.

Study each of your fields to know its weaknesses and its possibilities.

Harvest your crops so that you will receive the largest return from them.

Give your herd a chance.

Produce, care for and raise only the best.

If you are thinking of joining the union so that you will have but an eight or ten hour working day, do not think of trying to operate a small farm. To succeed in farming you must so enjoy your work that it becomes a pleasure instead of a task.

In fact, success in farming depends upon the man who runs the farm. For if he thinks enough of his problem he will succeed no matter what lines of farming he may pursue.

Utilize all of the farm. I study each field so that I know what crop it will produce to best advantage. A farmer can do this on the small farm since it is possible to utilize the smallest possible fields. The farmer on the small farm must utilize all the corners of the farm. The return from some fields on a small farm will be equal to the wastes upon many large farms.

Make soil productive. If my soil is acid I use lime. If my field is wet or poorly drained, I tile it. A farmer can fertilize the field, plow it, prepare the seed bed as it should be prepared and get the soil in the best condition for plant food and the maintenance of the moisture.

Raise most profitable crops. The farmer on a small farm must raise crops which are best adapted for his soil and from which the best returns in milk, pork, beef, or whatever you have to market, can be secured. Often the surplus roughage or hay can be sold and feeds bought which will produce more milk or meat than this hay or roughage would have done.

I found I could grow alfalfa on my farm and get good results. I made a study of the plant, found that it needed a well drained soil, and that it required a well prepared seed bed. I knew that I had a well drained soil and that it was necessary for me to supply the seed bed. The farmers who drove past stared at me when I harrowed and harrowed the field I was preparing for alfalfa. I went over the ground eleven times until it was as mellow as a well worked garden.

Sweet clover was growing three or four feet high along the roadside, so I inoculated my alfalfa field with the soil in which the clover had been growing. The stand did not satisfy me, so that when I planted my second field I fertilized the field before plowing it in the fall, disking and harrowing in the spring.

My first field yielded five tons to the acre, but it did not satisfy me. I bought a lime sower and ground limestone, and inoculated with soil from the old field at the rate of 500 pounds of soil to 2,000 pounds of ground limestone. I sowed 20 pounds of alfalfa and 25 pounds of barley to the acre. Because of the thorough preparation of the seed bed the barley yielded 40 bushels to the acre.

Upon this field last year eight tons of alfalfa hay were cut from every acre. My profit was 98.40 an acre, after deducting the interest on the land at \$200 an acre, the taxes, the cost of plowing disking, planting, fertilizing, and liming, besides the expense of cutting, tedding, raking, cocking, capping, shaking out and hauling the hay.

In curing alfalfa to get the largest return I cut the hay as soon as the dew is off in the morning and start tedding so that I can cock and cap the hay in the afternoon. About 3 o'clock the alfalfa is raked into windrows, carefully cocked (not tumbled) and then capped. I leave the hay in the cocks from eight to ten days, depending on the weather. (If necessary to leave the hay in cock for several days the cocks should be moved about so as not to kill or weaken the plants under them.) Then the cocks are opened up, but not scattered out, and the hay placed in layers so that the leaves do not become brittle and rattle off. An hour or two later I begin putting the hay in the mow. It is surprising how the alfalfa retains its color until it is thrown out of the mow in the following summer.

After paying his taxes, the interest on his investment, the cost of establishing a stand, and the expense of putting up the hay, Mr. Showers figures that he had nearly \$100 as a profit from each acre of his alfalfa.

Home grown feeds not always cheapest and best. I -

try to run my farm as the best business men run their business. Most business men would not feed their cows hay because it happened to be on hand if he could sell that hay and buy other feed which would produce more milk. Last year I sold \$300 worth of alfalfa and purchased feed valued at \$296.95. I did this so I could have a balanced ration, and I know my cows like a change in feed.

Manage the herd carefully. I try to make each cow as comfortable as possible. I give her a soft bed, plenty of bedding, curry her, and speak to her kindly. I find that these increase the dividend from my milk pails.

I make a difference in the amount of feed I give to a cow weighing 1000 pounds and one weighing 1200 pounds. Reason shows me that although the larger cow may not produce the largest amount of butter fat, more feed is required for her maintenance. The food, of course, will vary from the kind of food fed for butter fat. I think that the secret of success or failure in the dairy business lies in the worth of the individual cow.

I know it is possible and profitable to have one head of stock on each acre. My silo and alfalfa fields have helped me to unlock the secret of money making on a small farm.

FEEDING COWS FOR RECORD AND YEARLY PRODUCTION.

**P. A. CAMPBELL, MGR., THE BALSAMS STOCK FARM,
DIXVILLE NOTCH, N. HL**

With changed conditions; higher prices for food stuffs and the human race now consuming what was previously cattle feed we find that the methods for feeding cows have of necessity changed. Formerly it was safe to advise what combinations of food stuffs were best adapted for a farmer to feed his dairy cow; but now I am frank to say I hesitate about advising anyone unless I am intimately acquainted with their conditions. What one feeder succeeds with, another one fails with. The cows are probably different, maybe of a different breed. The quality of the roughage is likely different. The personal element of the man enters in so that when it is all summed up; what has formerly appeared equal is quite unequal. One farm may have a silo and plenty of silage, another one may be out of the corn belt and therefore cannot grow ensilage. Pastures on one farm may be good. On another one poor. Climatic conditions enter in so that the feeding of dairy cows on each farm is a problem by itself. There is one general problem however and that is to see what net returns a cow can be made to give for a year or a period of years.

By-products now form the cow's concentrated ration. Direct products have too much value as human food to be used for the cows. We were formerly accustomed to advise each feeder to mix his own rations; but it is now doubtful if he can buy the different grains, put them together and obtain the digestible food nutrients as cheaply as he can to purchase them in the form of prepared rations. The prepared rations have to conform to their guarantees; most of them are the result of a great amount of study and can be more uniformly mixed by machinery at the mill than by hand at the farm. Perhaps in the future the conditions may change so that the feeder can again mix his own rations cheaper.

Each dairyman is keeping and feeding his herd for the profit there is in so doing. He may be strictly a dairyman or he may be a combined dairyman and breeder. The breeder wants a calf each year from his cow. He has a right

to expect ten months of work at the pail besides the calf. Advanced Registry Records are merely records of performance, and none of the requirements in any of the breed associations are so large but what any cow that is worth keeping should equal the requirements. All of the dairy breeds have provisions for the yearly records and in addition the Holsteins have seven day, thirty day, ten months, and a seven day record made after she has been milked two hundred and forty days. The breed has sometimes been criticised for these short time records, but they are such that a cow that cannot make them would not have the ability to do a good year's work.

Unfortunately the cow is blamed for deficiency that properly belong to her caretaker. The so called Boarder cow has been discussed for years. A large percentage of them have the inherent qualities of production but are never given the preparation and feed to bring it out.

The dairy cow needs at least two months of rest. If milked up to the parturition, the result is a small gain in production for the time being but also a thin cow at calving, resulting in a poor state for a new lactation period and naturally a much smaller year's work. It is evident to anyone who has handled cows that anything which has a tendency to upset or decrease production during the early stages of the lactation period results in a continual loss throughout that year.

The real secret in a satisfactory record either yearly or of a lesser period is in the preparation a cow receives. Any factor that enters into the cow's life from the time she is born that may injure her digestion, or prevent her development casts a shadow on the future work of the cow. A heifer should have such growth and size that she may be bred to freshen between twenty-four and thirty months of age. She should be given a reasonably long lactation period to establish the milking habit and bred so as to freshen within twelve to fourteen months from the last calving. When she freshens as a three year old she should show an increased production over the two year form and again an increase at the next two calvings until when she is five years old she is in her matured form and supposed to be at her best, however it is quite possible for her to show improvement due to natural development for another year or two. If she has not made this natural increase and development, it is due to lack of preparation and handling.

A cow that has been fortunate in the method in which she has been handled should represent if her yearly records were plotted graphically a gradually ascending curve until

between the fifth and seventh years it would become level and then as she grew older it should gradually descend, the rapidity with which it descends, depends largely upon the cow's inherited and developed stamina as well as the earlier years' care and handling.

The cow to be in perfect shape at calving time, should have a smooth, velvety skin and hair, with a reasonable amount of fat under the skin and the muscular tissue fully developed. The cow should be in a laxative condition, wide awake and fully alert to what is going on about her. If in this condition when the udder begins to develop as a result of the approaching parturition a full development of the glandular tissue may be looked for, and a large full udder the result. To get a cow in this condition really means months of preparation. When the cow first freshens the incentive to milk production is so strong that she will naturally give in the milk a greater amount of total solids than the food which she consumes seems to warrant. As the lactation period increases in length and she gradually gets to the point where she takes a full amount of feed; she takes less and less from her body and finally the food she consumes offsets the production. As the lactation period increases in length and the production begins to decrease with the gradual development of a new foetus, the cow should receive more food nutrients than the production requires, with the result that she can again begin to build her body preparatory to another year's work.

The production of the dairy cow for a lactation period if plotted, being at zero just previous to parturition rises rapidly, directly after parturition has taken place and reaches its maximum sometimes within a month, the time actually varying according to the individuality of the cow. Usually after reaching the maximum there is a slight decrease, then if no other element enters in it should remain practically level until she is almost five months along with calf, the decrease being gradual until a couple of months before parturition it should again reach zero.

The factors entering in to determine whether the production remains where it should are many and varied. Generally speaking a ration that carries a reasonable amount of carbohydrates is more satisfactory than a narrow ration. After it has once been determined just what the cow actually requires to do her best and most economical work, changes in food stuffs and conditions should be as few as possible. Two lots of grain to all appearances may be alike and yet sufficiently different in analysis to upset the steady flow. Changing from one kind of hay to another

may cause a difference and the grain ration must be either increased or decreased to offset the difference. A new milker going into a herd most always causes a decrease and disturbance for a few days.

In following records on individual cows and in herds for year after year, this difference is noted, that the cow or herd that is well fed this year produces more the following year.

In conclusion it might be said that any thing that upsets the cow or is unfavorable to her is directly shown in the milk production and in the lessened profits.

BUSINESS MEETING.

The following resolutions were accepted and adopted, and upon motion properly made, seconded and carried it was voted that copies of same be sent to each member of our Congressional Delegation in Washington:

(1) The Vermont Dairymen's Association in Convention assembled thanks speakers, demonstrators, hotel and railroad managements, and all others who have contributed to the success of its annual gathering.

(2) In view of the fact that so long as the memory of man runneth this Association has not failed annually by resolution to "view with alarm" the activities of the oleo-margarine industry, it seems fitting to fulminate again, once more to protest vigorously, to urge our Congressional Delegation to keep its eight eyes open lest the law of the land be so modified that substitution may be made more easy. At the same time we recognize that milk, cream and butter sell at stepladder prices, that the demand exceeds the supply and we are not as scared as we used to be. Yet on the other hand we know that peace will come some day, that Europe will lessen her draft on our daily output, that prices will fall; and as against that day that it behooves us watchfully to wait.

(3) We hail the final enactment of the Smith-Hughes vocational education bill. Many times and oft during the five or more years of its slow progress through the mazes of federal legislation have we proclaimed our belief in its merits. We regret that because of the exigencies of political life the name of our honored junior senator is not associated with this measure in the form in which it finally passed, as it was in its earlier form, known as the Page bill. We know how much time and effort he put upon its shaping. We realize how greatly are our children and are generations yet unborn indebted to his many years of painstaking industry in its interests; we recognize that to his persistent, enthusiastic and effective leadership more than to the work of any other individual in public or in private life is due the final consummation of this, one of the most statesmanlike and important measures enacted at Washington during recent years; and we congratulate him on this for-

tunate fruition of his labors. In the firm belief that the education of youth along vocational lines, in agriculture, the trades and industries and in home economics, which this new enactment seeks effectively to promote, is one of government's most important functions and that the failure of our State to enter into cooperative relations with the Federal Government in this enterprise would be a lamentable mistake, we urge the General Assembly to look with favor on this constructive measure and to accept its challenge.

(4) We thoroughly approve the suggestion made by our president that some provision should be made through legislative enactment in order that such embarrassing situations as were encountered last fall in connection with the National Dairy Show may adequately be met. We commend the enterprise of the Commissioner of Agriculture in doing what he could under adverse circumstances. We favor the creation of an emergency fund, available at the discretion of the Governor for use in representing the agricultural interests of the State at gatherings of nation-wide scope.

(5) We favor the enactment of such remedial legislation as will tend to promote uniformity of practise on the part of town listers in appraising pure bred stock and to encourage its use. We realize that the present lack of uniformity tends to discouragement and injustice.

(6) We favor the proposition advanced by the Commissioner of Agriculture and the Secretary of the State Board of Health in their address before this Convention touching the expansion of the inspection system now in vogue under their direction. Indeed, in view of the fact that Massachusetts will be likely soon to enact a grading system for market milk similar to that now in operation in New York, it behooves us as dairymen to set our houses in order. Therefore we favor any reasonable enactment which will tend to better our dairy output, so be it that it does not require the impracticable or impossible.

(7) Believing that the proper field of this half century old organization is primarily educational, we hesitate as an Association to express ourselves as to many movements now in being, in legislative halls or elsewhere, bearing directly or indirectly upon the industry which we represent. We prefer to sin by omission rather than commission. However, we cannot fail to put ourselves on record as heartily favoring any well conceived movement on the part of dairymen, cooperative or otherwise, which will tend to make for adequacy of financial return for dairy products.

(8) Finally, we believe that the three principal of-

ficers of this Association should be deemed to be exofficio a legislative committee and be charged with the duty of seeing to it that the interests of this Association and its policies are properly represented at Montpelier, or elsewhere, and that their expense accounts in connection with such activities should be paid by the Association.

J. L. HILLS,
A. A. DUNKLEE,
W. H. PARTCH,

Committee on Resolutions.

The election of Officers resulted as follows:

President,	H. K. Brooks,	St. Albans,
1st Vice President,	O. L. Martin,	Plainfield,
2nd Vice president,	S. L. Harris,	Proctor,
Secretary,	F. H. Bickford,	Bradford,
Treasurer,	M. A. Adams,	Derby,
Auditor,	F. L. Davis,	Hartford.

Professor Hills introduced the following motion in substance, that the President, Secretary and Treasurer constitute a committee of three to do the following things:

Secure a revision of the public statutes (pertaining to this association), if possible, in so far as in their judgment they should be revised. (The speaker called attention to the fact that at the present time the statute provides that a meeting of this association shall be held three days; also that premiums shall be given on cheeses,—which has not been done for sometime. At present there are no premiums provided for market milk and these should be arranged for) and that these points should be submitted to this committee for their action and a report be made at the next meeting of the association.

Mr. Ernest Hitchcock of Pittsford offered an amendment by way of making the number of the committee five with full authority to put into immediate effect such suggestions as are desirable. Mr. Hitchcock also made a motion that the original motion of Professor Hills be put to a vote first. This was done and the motion declared passed. The Hitchcock amendment was then put to vote and was unanimously carried and the chairman appointed Doctor Hills and Mr. Hitchcock as additional members of the committee consisting of the Executive Officers.

Secretary Bickford presented a communication from the Ayrshire Association in which they requested that the Ayrshire breed be featured for the next meeting of the association. On motion this communication was voted to be referred to the officers having power to act.

A written invitation was presented by the Burlington Business Men's Association asking that the association meet next year in Burlington; and the St. Albans Business Men's Association sent a delegation of several of its members who met with the Executive Officers at the close of the meeting, urging that the association hold its next meeting at St. Albans.

Mr. True, a member of the Vermont Sugar Makers' Association spoke on behalf of that Association requesting that it be permitted to hold its next annual meeting in connection with the dairymen.

FINAL ADJOURNMENT.

BANQUET.

The banquet was held at Hotel Vermont Thursday evening and was attended by about 250 persons. Excellent musical selections were furnished during the evening by Lessor's Orchestra.

Following the banquet President Brooks presented Congressman Frank L. Greene who presided as toastmaster over the postprandials. Following his pleasing bow and salutation to his friends that he was glad to be back home, Mr. Greene said he felt called upon to give an account of his stewardship to the people of Vermont and he proceeded to relate in a deeply interesting manner the "doings" of the national law makers at Washington, laying special stress upon the apparent conscientious methods in use by each representative and senator, who seemed to be impressed with the tensity of the political situation at present. His peroration was particularly patriotic and dramatic and called forth rounds of applause.

Governor Graham's topic was "Some Needs of Vermont"; the needs, he said, were many, and he forecasted that the state would do more for agriculture and forestry in the future and that it would be done under one head. He advocated continued and increased advertising of the resources of the state, and said it was well to advertise the scenery, the hotels and good roads, but that it was particularly well that real estate and farms now unoccupied and for sale should be brought to the attention of the public, in that manner attracting to the state desirable people who would make their homes among us. He emphasized the need of having all information relative to such real estate absolutely authentic.

The toastmaster introduced the next speaker, Colonel Ira L. Reeves as an "approved soldier". Colonel Reeves spoke interestedly of the "Reserve Officers' Training Corps", and paid tribute to Senator Morrill by saying that it was due to a Vermonter that military training was introduced in the colleges of this country. He said the North saw the necessity for trained officers, so in drafting the agricultural law, the Morrill military clause was introduced as a part of the instruction to be given in agricultural schools; that there

are fifty-two of these schools to-day (Land Grant schools) and this year there are forty thousand students taking military instruction in them and in addition thereto a number of private or state institutions of various kinds also giving military instruction. The scheme did not prove all together a success, the instruction not being sufficiently strong to turn out a trained officer and in 1916 Congress passed the National Defense Act, probably the most revolutionary piece of law-making Congress has ever enacted; in this bill was placed a proposition to remedy some of the defects in the earlier Morrill act; it created what is called the Reserve Officers' Training Corps and enables any educational institution in the United States who agrees to give military instruction, the right to create a unit in the Reserve Officers' Training School. Vermont has two colleges which have adopted it, the University of Vermont as an infantry unit and Norwich as a Cavalry unit.

Honorable H. K. Darling, upon being presented as "a man strong in good fellowship, possessed of a gentle, kindly heart and lively spirit", responded to the toast assigned him "Revamping the Statutes" in his manner of inimitable drollery, telling many really good stories apropos to the situations he created.

"Some problems relating to rural Education" was the subject of Mr. Milo B. Hillegas' speech. He was emphatic in his assertion that the big problems that our schools, rural and otherwise, have to deal with is the upper part of the anatomy (meaning the portion above the shoulders) as well as the lower; and said that the head must be trained properly and thoroughly to bring out the best in a boy or girl and that it can only be done when the instructor lives close to the very life of the individual.

The last speaker was professor P. A. Campbell of New Hampshire who spoke briefly of his work, in particular that of farm director of several large estates, and of the benefits derived from agricultural pursuits in general.

WOMEN'S AUXILIARY

About sixty members of the Association of Dairymen's Wives and Daughters attended an informal meeting in the parlors of Hotel Vermont, Jan. 10, 1917. A large proportion of the ladies present answered to the roll call on "Some personal discovery whereby the home work is made easier." Fireless cookers, new fashioned ovens and other kitchen devices were the most commonly mentioned. Following that, was an informal discussion on best methods of canning, preserving and jelly making. Several ladies illustrated their receipts by displaying samples which were tested by those present. It was a most timely and interesting meeting.

Mrs. H. M. Farnham, Secretary.

WOMEN'S AUXILIARY.

A most enjoyable meeting of the association was held Thursday January 11, on the roof garden of Hotel Vermont, Mrs. F. H. Bickford presiding. The program was one of interesting to those ladies attending. Following greetings by the president, there were vocal selections by Miss Frances tenney of St. Albans, a student of the University of Vermont. Mrs. Myra B. Johnson of Bradford gave a highly entertaining and profitable paper on "Economics" which dealt largely with various economies which can easily be practiced by farm women.

Miss Helen Holmes who conducts Hillholme Farm in Massachusetts, on which is a fine green house, truck and dairy farm, held the closest attention of her audience with a unique story of how a farm can be successfully conducted by a woman.

Miss Helen Hall of Burlington, a student of the University gave two much appreciated readings. The afternoon's program was brought to a close with a talk by Mrs. Elizabeth Jones Chase of Lyndon whose topic was "Dairying and Other Features of the Lyndon Boys' and Girls' Home Project Club". As in years before, the story of her varied work in Lyndon was very highly enjoyed.

The sum of \$10.00 was voted to state Federation Woman's Club Scholarship Fund and another years meeting was closed.

Mrs. H. M. Farnham, Secretary.

LIFE MEMBERS OF THE VERMONT DAIRYMEN'S ASSOCIATION, 1917.

A

Armo, R. A. Williston
 Amboro, John Derby
 Andrews, E. R. Putney
 Alden, B. H. Orleans
 Adams, G. H. South Barre
 Adams, M. A. Derby
 Allen, Charles East Berkshire
 Allen, H. A. West Milton
 Allen, Henry Pawlet
 Adams, William H.,
 369 Marlboro St., Keene, N. H.
 Aseltine, M. L. Springfield, Mass.
 Aldrich, E. O.,
 R. F. D. No. 2, No. Clarendon
 Allen, G. A.,
 R. F. D. No. 2, West Brattleboro
 Allen, F. E.,
 R. F. D., South Royalton
 Ansboro, J. E. Derby

B

Baker, O. W. Concord
 Bruce, M. K. Passumpsic
 Badger, C. A. Williamstown
 Burnett, R. E. North Pomfret
 Burbank, J. A. North Pomfret
 Burr, L. R. North Clarendon
 Brownell, C. W. Burlington
 Brigham, William O. .. Bakersfield
 Burt, William Essex
 Burt, Frank Enosburg Falls
 Blair, N. B. Morrisville
 Bliss, Abner Georgia
 Beecher, H. A. Hinesburg
 Bates, A. E. Huntington
 Barnum, Ell,
 R. F. D. No. 1, Plainfield
 Brown, J. S. Plymouth
 Bishop, D. B. North Williston
 Byington, C. M. Charlotte
 Bigelow, A. P. Middlesex
 Burke, J. E. Burlington
 Burnham, W. F. So. Royalton
 Barry, R. A.,
 173 Chambers St., New York City

Beach, H. F. R. F. D., Vergennes
 Brooks, H. K. St. Albans
 Brigham, E. S. St. Albans
 Bristol, R. H. Vergennes
 Briggs, E. L. North Pomfret
 Burnett, E. A.,
 University, Lincoln, Neb.
 Bond, John East Montpelier
 Blood, W. O. Norwood, N. Y.
 Bass, E. L. Randolph
 Bruce, H. C. Milford, N. H.
 Barry, Leonidas Springfield
 Brothers, H. F. Hinesburg
 Brackett, W. R.,
 9 Chatham St., Boston, Mass.
 Bean, G. C. Coventry
 Belden, H. W. Waitsfield
 Bickford, F. H. Bradford
 Buxton, J. E. Middletown Springs
 Brock, L. F. Barnet
 Barber, E. L. North Williston
 Bushnell, H. N. Waitsfield
 Burrell, D. H. Little Falls, N. Y.
 Bigelow, A. P. St. Johnsbury
 Brewer, J. R. Hingham, Mass.
 Burgham, W. H. Montpelier
 Beach, W. V. Charlotte
 Bent, Orrin,
 33 S. Market St., Boston, Mass.
 Boutwell, W. C. Princeton, Me.
 Bristol, E. S. Vergennes
 Bellows, F. A. No. Ferrisburg
 Boyden, C. F. Randolph Center

C

Curtis, H. B. St. Albans
 Conn. Agricultural College,
 Storrs, Conn.
 Clifford, A. P. North Pomfret
 Cushman, G. L.,
 75 S. Market St., Boston, Mass.
 Carpenter, E. P. West Waterford
 Chaffee, J. H. West Enosburg
 Congdon, Edwin Clarendon
 Cahes, L. J. Brandon
 Cook, Nelson P. Mt. Holly
 Currier, P. W. Montpelier

Clarke, M. S. Clarendon
 Clarke, F. H. Williston
 Corliss, N. L. Swanton
 Carter, W. E. Pittsford
 Carrigan, J. D. Pittsford
 Cady, W. N. Middlebury
 Creed, C. A. Pittsford
 Campbell, H. W. Bethany, Neb.
 Chapman, J. H. West Rutland
 Chaffee, Geo. H. Rutland
 Cooke, Geo. S. E. Hardwick
 Crampton, M. S. Rutland
 Chapin, Wm. Middlesex
 Cowdon, H. St. Johnsbury
 Colvin, J. C. West Rutland
 Cunningham, W. F. St. Albans
 Colburn, R. M. Springfield
 Crampton, Charles A. St. Albans
 Cobb, C. H.,

R. F. D. No. 2, Fairfax
 Crane, George Brookfield
 Chase, C. P. Proctorsville
 Chandler, G. C. Montpelier
 Chase, Perry East Fairfield
 Carpenter, O. G. Cambridge
 Candon, J. B. Pittsford
 Cloverdale Creamery,

North Underhill
 Chamberlin, H. D.,
 McIndoes Falls
 Campbell, Archie,
 R. F. D., South Ryegate
 Curtis, A. C. St. Albans
 Carter, A. C. Rutland
 Clark, Homer F. Charlotte

D

Daley, O. W. White River Junc.
 Donahue, W. C. Monkton
 Draper, F. W. Enosburg Falls
 Dana, E. J. North Pomfret
 Donahue, J. F. Vergennes
 Doe, G. A. Newbury
 Dutton, F. B. Woodstock
 Davis, G. A. Rutland
 Donahue, W. F. Ferrisburg
 Donahue, T. E. Hinesburg
 Dodge, Harrison Morrisville
 Donahue, D. G. East Charlotte
 Davis, George F. Cavendish
 Darling, E. L. East Burke
 Davis, G. N. Castleton
 Downer, Charles Sharon
 Davis, C. H. E. Healdville
 Davis, F. L. Hartford
 Dagon, M. R. Madison, Wis.

Dreman, R. E.,
 State College, Ames, Iowa
 Dodge, L. B.,
 300 No. Main St., Barre
 Davis, Geo. H. Hubbardton
 Dunsmore, Geo. H.,
 R. F. D., St. Albans
 Dunklee, A. A. So. Vernon

E

Eldred, H. S. Sheldon
 Ellis, I. L. Middlebury
 Edson, E. A. Chester
 Eddy, C. F. Stowe
 Ellis, Edward A. Castleton

F

Federal Trade Commission
 Washington, D. C.
 Farm Stock Success
 Chenango, N. Y.
 Foster, F. O. Lansing, Mich.
 Flint, J. S.,
 155 Loomis St., Burlington
 Flint, J. P. Montpelier
 Fisher, L. C. Cabot
 Farrington, C. W. West Danville
 Fletcher, William. Essex Junction
 Fassett, G. S. Enosburg
 Fisher, D. W.,
 Marbridge Bldg., New York, N. Y.
 Ferson, B. W. Goshen, N. Y.
 Fassett, B. F. Enosburg Falls
 Fassett, W. G. Enosburg
 Fuller, C. C. Jonesville
 Fowler, F. E. South Royalton
 Fletcher, Ex-Gov. A. M.,

Cavendish
 Fraser, W. J. Urbana, Ill.
 Fillmore Farms Bennington
 Fuller, B. J. Williston
 The Free Library,
 17th & Spring Garden St.,
 Philadelphia
 Farnham, H. M. Montpelier

G

Gibbie, Geo. Groton
 Gale, P. R. Stowe
 Gates, Gov. C. W. Franklin
 Grout, L. D. Morrisville
 Grout, J. Ex-Gov. Derby
 Gloyd, Jesse Richmond
 Gilman, A. A. Randolph Center
 Goodspeed, Nelson St. Albans
 Gallup, J. A. West Woodstock

Greene, G. F.So. Pomfret
 Gates & Son, Charles
 North Hartland
 Gale, J. E.Gulford
 Goss, W. G.,
 R. F. D. No. 4, St. Johnsbury

H

Howie, A. F. Mrs.,
 Elm Grove, Wis.
 Hewitt, J. D.North Pomfret
 Hill, W. N.Starksboro
 Hathaway, F. M....St. Albans Bay
 Hooper, V. A.Blockton, Ark.
 Hastings, S. J.Passumpsic
 Harvey, CloudBarnet
 Hills, J. L. Prof.Burlington
 Hayward, G. M.Middlebury
 Heller & Merz Co.,
 505 Hudson St., New York City
 Hotchkiss, C. A.Georgia
 Heffon, Franklin..Highgate Center
 Haskins, Kittredge, Hon.,
 Brattleboro
 Hutchinson, WilliamNorwich
 Hill, H. C.Isle La Motte
 Hillis, E. C.North Montpelier
 Howard, Ernest S...West Hartford
 Hall, L. C.Westford
 Herick, A. A.,
 R. F. D. No. 2, Milton
 Hall, CharlesMontpelier
 Head, George G....Montgomery
 Harwood, J. W.Orwell
 Hewitt, Stephen ...North Pomfret
 Hoadley, A. E. ..South Woodstock
 Howe, W. H.,
 R. F. D., South Royalton
 Hayes, J. R.Stafford
 Hitchcock, ErnestPittsford
 Higley, NathanRichmond
 Hodges, R. W. ..Springfield, Mass.
 Harwood, Burr,
 R. F. D. 1, Salem, N. Y.
 Harris, S. L.Proctor
 Huntley, George M.,
 R. F. D., Fairfax
 Hopkins, Hermann, Jr.,
 Sheldon Jct.
 Harrington, W. H...North Pomfret
 Hyde, Wheeler & Co.,
 41 N. Market St., Boston
 Hastings, C. A.,
 17 Union St., Springfield
 Hayward, F. R.West Fairlee
 Heath, W. E.Sharon

Hood, C. H.,
 494 Rutherford Ave.,
 Boston, Mass.
 Howe, E. L.,
 R. F. D., So. Ryegate
 Hazard, G. M.....Charlotte
 Hewitt, MaryNo. Pomfret
 Howard, E. S.....W. Hartford

I

Iowa State Library,
 Des Moines, Iowa
 Isham, Ed.St. George
 Irish, V. H.Enosburg Falls

J

Jones, E. H.Waitsfield
 Jackson, L. A.Hartford
 Jackson, J. J.Fair Haven
 Judd, MortonWindsor
 Jaynes, R. F.,
 65 Central Ave., Lynn, Mass.
 Jewett, A. & Son.....Middlebury
 Jones, G. M.Waitsfield
 Jenne, A. M....R. F. D., Richford
 Johnson, C. C.Pomfret
 Jennings, B. C.E. Hardwick

K

Kelley, G. A.Underhill
 Kingsley, C. J.West Salisbury
 Kingsley, H. E....Montgomery
 Kinnerson, J. R.Peacham
 Kidder, N. D.Hastings, Neb.
 King, M. D.Woodstock
 Kneeland, D. A.Waitsfield

L

Leonard, Geo.Brandon
 Lyster, H. L.Wells River
 Lilly, J. O.Plainfield
 Lyster, T. H.St. Johnsbury
 Lawrence, HenrySt. George
 Lawless, C. C.,
 North Haverhill, N. H.
 LePage, CharlesBarre
 Loveland, J. H.Norwich
 Leary, J. A.Jericho
 Leonard, W. B.Orleans
 Lewis, M. J.Woodstock
 Lewis, A. L.Rochester
 Lilley, C. M.Marshfield
 Leonard, C. H.No. Pomfret

M

McCuen, R. W. Vergennes
 Maynard, A. S. Bakersfield
 Marvin, Thomas Montpelier
 Mosely, F. W. Clinton, Iowa
 Messer, F. A. Greensboro
 Moore, A. A. Richford
 Maxham, G. R. Woodstock
 Merrill, H. J.,

R. F. D. No. 2, Burlington

Milligan, F. B. Walden
 McMahon, C. L. Stowe
 McLam, J. F. So. Ryegate
 Macomber, F. H. Shelburne
 McNall, J. M. Milton
 McGaffey, E. E.,

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Animal Industry,

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McCauley, D. F. Shoreham

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McLam, G. E. Topsham

Moody, Mark L. Waterbury

N

Nelson, David,

34 Allen Ave., Springfield, Mass.

Newton, C. H. ... Fargo, North Da.

Nay, Y. G. Jericho

Northrup, P. B. B. Sheldon

Newell, Bigelow Stowe

Nute, Byron Lakeville, Mass.

Newton, W. D.,

R. F. D., St. Albans

N. H. Agricultural College

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N. Y. State Library,

Albany, N. Y.

Noyes, E. H. Sharon

Noyes, M. C. Sharon

P

Plummer, E. G. Groton

Public Library St. Louis, Mo.

Porter, W. C. Sharon

Page, L. B. Randolph Center

Parker, E. J. Grand Isle

Parker, J. B. Whiting

Paine, C. S. Bethel

Page, C. S., Ex-Gov. Hyde Park

Powers, William Brandon

Perry, S. E. South Pomfret

Pierce, J. H. Franklin

Phillips & Son... E. Candia, N. H.

Pierce, C. C. East Clarendon

Place, R. H. Essex Junction

Perkins, W. E. Pomfret

Palmer, George New Haven

Palmer, C. E., New Haven

Prouty, G. H., Ex-Gov. Newport

R

Richardson, A. E. Burlington

Rie, Eli West Charleston

Russell, F. L. Shrewsbury

Richmond, H. J. ... Deerfield, Mass.

Roberts, D. W. West Hartford

Reynolds, M. W. Middlesex

Robbins, Henry Middlebury

Roberts, L. J. Waterbury

Ruggles, E. H. Westford

Rice, H. W. Brookside

Rutherford, W. L.,

Waddington, N. Y.

Ricker, N. H. Ryegate

Russell, F. L. Cuttingsville

Ridlon, M. R.,

R. F. D., Cuttingsville

Robbins, H. E. Derby

Ryan, D. E. Orwell

Roberts, G. V. Milton

Roundy, Charles C.,

136 Paine St., Worcester, Mass.

S

State Dairy Bureaus,

State House, Boston

Shackford, Mrs. C. J. Nelson,

Ryegate

Stone, W. P. Strafford

Sawyer, A. G. Groton

Spear, V. I. Randolph

Strong, P. W. North Pomfret

Slocum, A. R. South Burlington

Stanhope, Spencer,

Berkshire Center

Stevens, S. H. Enosburg Falls

Snell, T. T. North Enosburg

Stiles, G. M. Morrisville

Standard Package Co.,

Board Trade Building,

Boston, Mass.

Stevens, Wm. Stanford.. St. Albans

Small, Fred M. Morrisville

Stevens, N. C. West Glover

Sanderson, W. L.Milton
 Sowles, A. P.St. Albans
 Smead, C. D.West Brookfield
 Seely, H. M.Middlebury
 Smith, C. F.Morrisville
 Spaulding, L. C.Poultney
 State LibraryConcord, N. H.
 Sherburne, A. E....North Pomfret
 Smith, N. E.Richford
 Smith, F. V.Stowe
 Smith, George G.....St. Albans
 Simpson, W. G.So. Ryegate
 Smith, F. L.Fletcher
 Sowles, E. A.St. Albans
 Smith, E. C., Ex-Gov....St. Albans
 Sprague, N. T. Jr.,

Brooklyn, N. Y.

Strihues, J. J.....Randolph
 Snow, Mrs. Edward,

Swansey, N. H.

Sprague, George K.,
 East Brookfield

Swan, P. B.Montgomery
 Scarff, C. W., Col...Seattle, Wash.
 Sellow, Robt. P.,

7 Merchants Row, Boston, Mass.

Sudendorf, E.,
 412 E. Monroe St.,

Springfield, Ill.

Stone, M. S.....Montpelier

Stone, E. A.Williamstown

Seaver, W. H.Taftsville

Somers, C. L.South Peacham

Smith, E. E.West Rutland

Sykes, A.Hinesburg

Sisson, Ellsworth,
 P. O. Box 1176,

Providence, R. I.

T

The Jewish Farmer,
 17 Second Ave.,

New York, N. Y.

Towne, E. B.Milton

Turnbull, J. G.Orleans

Tarbox, C.Jericho

Towle, E. R.Enosburg Falls

Teachout, S. D.Essex Junction

Tarbell, E. S.Montgomery

Terrill, G. H.Morrisville

Tottingham, L. H.Shoreham

Talcott, D. L.Williston

Talcott, L. F.Williston

Talcott, J. R.,

1760 High St., Oakland, Cal.

Talcott, FrankWilliston

Tarwell, F.Hampton, N. Y.

Terrill, A. N.Morrisville
 Temple, G. H.Randolph Center
 Towle, W. W.Enosburg Falls
 Trescott, A. J.West Rutland
 Tracey, J. E.Burlington
 Tear, Frank..R. F. D., W. Rutland

U

Union Association Press,
 47 Ann St., New York

V

Vail, H. W.Randolph
 Van Patten, W. J.Burlington
 Varney, W. M.Vergennes

W

Washburne, R. M. University Farm
 St. Paul, Minn.

Willard, E. G.No. Hartland

Warren, L. H.North Pomfret

Willey Bros.Cambridge

Ware, O. T.Brattleboro

Whitcher, J. R.,

R. F. D. No. 3, Groton

Williams, W. H.Rutland

Wright, Will W.....Brandon

Wheeler, N. B.,

Bakers Mills, N. Y.

Winslow, C. M.Brandon

Wry, I. A.St. Albans

Washburn, ChatBrandon

Williams, N. G.Bellows Falls

Walker, N. S.Clarendon Springs

Woodward, J. S.Enosburg

Winslow, H. L.North Clarendon

Weed, E. D.Hinesburg

Warren, RufusMontpelier

Wheelock, H. R.Montpelier

Wright, J. J.So. Hero

Whipple, Obed Jr...North Pomfret

Wheeler, F. H.Proctorsville

Warner, J. N.St. Albans

Whitney, Ed....Minneapolis, Minn.

Wright, H. S.North Williston

Willard, D. S.North Hartland

Whitney, H. O.Essex Junction

Whitelaw, F. R.....Randolph

Wheeler, W. H.South Pomfret

White, A. R.Burlington

Wallace, SidneyWaterbury

Walker, H. W.South Woodstock

Williams, J. B.,

Glastonbury, Conn.

Webb, J. T..New Braintree, Mass.

Weed, B. W.....St. Albans
 Whitman, C. D. Fisher's Island,
 New London, Conn.
 Warner, B. F.....East Burke
 Wilson, James Ex. Sec'y Agr.,
 Tama, Iowa
 Winslow, Chas. L....No. Clarendon

Wiggin, F. WarrenQuechee

Note—Your Secretary would consider it a favor if the members would notify him of any changes or corrections in the above list.

ANNUAL MEMBERS, 1917.

Mogens R. Tolstrup.....St. Albans
 L. J. Peterson.....St. Albans
 E. E. GoveBurlington
 E. H. FrinkCharlotte
 Chas. CrossBurlington
 E. C. TenneyBrattleboro
 H. M. LeeWindsor
 S. R. WetherellShoreham
 Benj. TuckerTunbridge
 W. M. BarberWilliston
 W. E. Smith,
 8 Huntington Ave., Boston
 W. F. ShepardBarre
 J. J. Wall,
 17 Melville Ave.,
 Dorchester, Mass.
 S. D. Wright.....W. R. Junction
 F. B. HasenBurlington
 D. D. Bendette Jr.....Pittsford
 W. C. Fuller.....Richmond
 John C. Orcutt,
 177 Milk St., Boston
 Luther PutnamCambridge
 Ellsworth Sisson..Providence, R. I.
 Alice BronsonE. Hardwick
 R. H. Wilcox.....Isle La Motte
 H. J. Wright.....St. Albans Bay
 Rhett FletcherWinooski
 C. A. CramptonSt. Albans
 F. G. StoneDorset
 C. R. ChapinEssex Junc.
 H. T. JohnsonBradford
 Geo. H. Clark,
 R. D. No. 2, Barre
 M. C. Saunders,
 61 Chatham St., Boston

C. D. HazenW. R. Junction
 F. C. BatesGulford
 Robt. A. Ritchie..Greensboro Bend
 D. A. BlainBarnet
 D. A. McPherNo. Peacham
 Mrs. Russell Tyson....Brattleboro
 C. S. HarrisFerrisburg
 Ernest DevineFerrisburg
 J. R. MooreE. Barnet
 Rowland T. Robinson ..Ferrisburg
 M. G. Eastman.....Lyndonville
 Eugene BeandetAddison
 N. D. LavineEssex Junc.
 Geo. B. DouglasCambridge
 Edwin M. Murdock...Jacksonville
 C. M. RoyBarnet
 T. W. PerleyEnosburg Falls
 John N. DuttonNo. Craftsbury
 E. A. DodgeSo. Hero
 L. C. LitchfieldMiddlebury
 D. S. BlissMiddlebury
 E. B. Perry & SonIra
 J. A. SantamoreStowe
 C. O. HarveyFletcher
 E. R. CampbellMontpelier
 H. W. GilletteMontpelier
 G. A. KnappSt. Johnsbury
 I. P. Grant,
 9 Fullerton Place Boston
 H. P. Hood & Sons....Woodstock
 C. E. MartinRochester
 E. E. PerleyR. D. Richford
 Geo. L. Nichols....Enosburg Falls
 M. L. Hubbell....Enosburg Falls
 E. J. CorseRiverside
 R. H. MetcalfStowe

LIST OF CREAMERIES AND CHEESE FACTORIES IN VERMONT.

Corrected up to May 1, 1917.

ADDISON COUNTY.*Creameries.*

1. Elgin Springs Creamery, Elgin Springs Cry. Co., R. D. 1, Vergennes, Eugene Beaudette, Maker.
2. Donahue's Creamery, Monkton, W. C. Donahue, Prop. and Frank McEntee, Maker.
3. Green Mountain Cold Spring Creamery, Starksboro, B. G. and W. C. Donahue, Owners, D. G. Donahue, Maker.
4. Lake Dunmore Creamery, C Lake Dunmore Cry. Co., Salisbury, F. B. Nelson, Maker.
5. Lincoln Creamery, Lincoln Cry Co., Lincoln Center, F. C. Chapman, Maker.
6. New Haven Mills Co-op. Creamery, New Haven Mills Co-op. Cry Co., Bristol, Vt., J. B. Lucia, Maker.
7. Orwell Creamery Tait Bros., Owner, Fair Haven, W. W. Smith, Maker.
8. Reef Bridge Creamery, Reef Bridge Cry. Ass'n. Middlebury, L. B. Whitman, Maker.
9. Vergennes Creamery Co., Vergennes, J. F. Donahue, Prop. and Maker.
10. Middlebury Creamery, Middlebury Co-op. Cry. Co., Middlebury, G. M. Hayward, Maker.

Cheese Factories.

1. Beaver Glen Cheese Factory, Palmer Bros., New Haven.
2. Nichols Cheese Factory, O. M. Sherbino, Mgr., Bridgport.
3. West Bridoort Cheese Factory. (Details not known.)
4. Orwell Cheese Factory, Orwell Cheese Factory Co., Orwell, J. H. Suprenant.

5. Shoreham Cheese Factory, C. B. Kendall, Shoreham, E. J. Woodbury, Maker.
6. Red Clover Cheese Factory, Geo. Ellis, East Shoreham.

Shipping Stations.

1. Sheffield Farms Slawson, Decker Station, New Haven Jct., Roy Kingman, Mgr.
2. C. Brigham Co., No. Ferrisburg, F. A. Bellows Mgr.
3. Mutual McDermott Dairy Co., Middlebury, C. C. Davis, Mgr.
4. Sheffield Farms Slawson Decker Co., Vergennes, S. B. Bacon, Mgr.
5. Sheffield Farms Slawson Decker Co., Ferrisburg, H. C. Dubuc, Mgr.
6. C. Brigham Co's Station, Leicester Jct., P. O. Brandon, R. D., Martin E. Minnoe, Mgr.
7. Mutual McDermott Dairy Co., West Salisbury, Richard G. Noyes, Mgr.
8. C. Brigham Co., Bristol, W. H. Orvis, Mgr., J. W. Copley Dist. Mgr., Rutland.
9. Avery's Creamery, Ferrisburg, L. E. Avery, Prop., G. S. Powell, Mgr.

BENNINGTON COUNTY.

Cheese Factories.

7. West Arlington Cheese Factory, S. H. Hawley, Arlington, Levi Fairbanks, Maker.
8. Dorset Cheese Factory, Dorset Cheese Ass'n, Dorset, Frank Streeter, Maker.
9. No. Rupert Cheese Factory, No. Rupert Cheese Co., Pawlet, S. C. Adams, Maker.

Shipping Stations.

10. C. Brigham Co's Cheese Factory and Station, East Dorset, H. P. Stone, Mgr.
11. Castleton Dairy Co's Station, West Rupert, John Shaw, Mgr.
12. Schade's Milk Station, Rupert, C. A. Sheldon, Mgr., W. M. Shades, Yonker, N. Y., Prop.
13. Manchester Creamery, Manchester, Manchester Dairy Co., F. D. McGuire, Mgr.
14. Hood's Station, West Rupert, H. P. Hood & Son, Owners, E. D. Cramer, Mgr.

CALEDONIA COUNTY.

Creameries.

11. Pine Hills Creamery, Mrs. S. A. Buck, Prop. and Maker, Wheelock, Vt.
12. Mountain View Creamery, Mountain View Cry. Co., West Barnet, John Strobridge, Maker.
13. Lamoille Valley Creamery, Lamoille Valley Cry. Ass'n, East Hardwick, B. C. Jennings, Mgr.
14. Passumpsic Creamery, Passumpsic Cry. Ass'n, Passumpsic, M. K. Bruce, Mgr.
15. Montgomery Creamery, F. S. Montgomery, East Hardwick, Prop. and Maker.
16. St. Johnsbury East Creamery, St. Johnsbury E. Creamery Co., St. Johnsbury East. Maker?
17. Danville Creamery, Danville Cry. Ass'n, Danville, F. S. Morse, Maker.
18. St. Johnsbury Cry., St. Johnsbury, Beauregard Bros., Owners, W. J. Beauregard, Maker.
19. Lyndonville Creamery, Lyndonville Cry. Ass'n Lyndonville, W. C. Conner, Mgr.
20. North Danville Co-op. Creamery, No. Danville Co-op. Creamery, Ass'n North Danville, O. V. Exley, Maker.
21. Burke Co-op. Creamery, Burke Co-op. Cry. Ass'n, Burke, E. W. Smith, Maker, R. W. Densmore, Secy. and Treas.
22. Barnet Creamery, Barnet Cry. Ass'n, Barnet, Perley Ayer, Maker.
23. McIndoes Co-op. Creamery, McIndoes Cry. Co., McIndoes, R. N. Crane, Maker.
24. East Barnet Co-op. Creamery, East Barnet Co-op. Creamery Ass'n, East Barnet, W. D. Cilley, Maker.
25. South Peacham Co-op. Cry., So. Peacham Co-op. Cry. Ass'n, South Peacham, D. F. McPhee.
26. South Walden Creamery, South Walden Cry. Ass'n, South Walden. Recently sold to the Holland Creamery Co., Derby Line, Vt., W. J. Prindle, Maker.
27. Sheffield Co-op. Creamery, Sheffield Co-op. Cry. Ass'n, Sheffield. Maker?
28. Noyesville Creamery, Walden, F. A. Messer, Montpelier, Prop., Charles W. Goss, Maker.

Shipping Stations.

15. Hardwick Creamery, Hardwick, Leased to N. P. Cooke, Mt. Holly, James McCaffrey, Maker.
16. Ryegate Co-op. Cry., Ryegate Co-op. Cry. Co., Ryegate, Wm. Nelson, Mgr., Fred Chapman, Maker.

CHITTENDEN COUNTY.

Creameries.

29. Richmond Co-op. Creamery, Richmond, Co-op. Creamery Ass'n, Richmond. F. H. Edwards, Mgr., R. R. Stacy, Maker.
30. Jericho Co-op. Creamery, Jericho Cry. Ass'n, Jericho, B. S. Morgan, Maker, H. H. Day, Secy.
31. Jonesville Cry., Borden Condensed Milk Co., Richmond, C. C. Fuller, Maker.
32. Lake Champlain Cry., W. B. Johnson, Essex Jct., Prop., A. D. Lavine, Maker.
33. Westford Creamery, Belden & Pierce, Owners, Westford, H. E. Pierce, Maker.
34. Browns River Creamery, Browns River Cry. Ass'n, Essex Ctr., C. V. Roberts, Maker.
35. The Riverside Co-op. Creamery, Riverside Co-op. Creamery Co., Riverside., R. E. Corliss, Maker, Hayden, Secy.
36. Johnson Creamery, T. W. Johnson, Prop., Huntington.
37. Chittenden County Creamery, Chittenden County Cry. Ass'n, Hinesburg, F. E. Harvey, Maker.
38. Donahue's Creamery, Essex Jct., M. F. & W. C. Donahue, Owners, M. F. Donahue, Mgr.
39. Shelburne Co-op. Creamery, Shelburne Co-op. Cry. Co., Shelburne, H. B. Thompson, Maker.
40. Donahue's Creamery, Milton, J. D. & W. C. Donahue, Owners, Tom Donahue, Maker.
41. Donahue's Creamery, West Milton, J. D. & W. C. Donahue, Owners, R. Tracy, Maker.
42. Fuller's Creamery, Williston, Mr. Fuller Prop. and Maker.
43. Greenmount Creamery, Underhill Ctr., W. G. Brown, Prop. and Maker.

Condensaries.

1. Borden's Condensary, Richmond, Borden's Condensed Milk Co., Richmond, Mr. Shepardson, Supt.

2. Borden's Condensary, Hinesburg, P. E. Demick, Mgr.,
Borden's Condensed Milk Co., Richmond.

Shipping Stations.

17. Colchester Co-op. Creamery, Colchester, M. B. Leach,
Maker, leased to Moretown Creamery Co.
18. Hood's Plant, No. 13, Milton. J. W. Kingsbury, Mgr.
19. D. Whiting & Sons, Milton, W. G. Newton, Mgr.
20. Cloverdale Creamery, Cambridge, Moretown Creamery
Co., Middlesex, W. H. Gomo, Mgr.
21. Borden's Station, Underhill, Borden's Cond. Milk Co.,
Richmond, Henry Murdock, Mgr.
22. Sheffield Farm, Slawson Decker Co., Charlotte, Ira
Brooks, Mgr.
23. Lake View Creamery, Lake View Creamery Co., Char-
lotte, Peter Aunchman, Mgr.
24. Hood's Station, Williston, North, M. White, Mgr.
25. Borden's Station, Williston, Borden's Cond. Milk Co.,
Richmond, C. G. Austin, Mgr.

ESSEX COUNTY.

Creameries.

44. Brighton Creamery, Island Pond, Simmons & Ham-
mond, Portland, Me., Owners, E. M. Bartlett,
Mgr., H. O. Humphrey, Maker.
45. Trout Brook Creamery, Concord, Trout Brook Cry.
Co., A. M. Baker, Mgr.
46. Lunenburg Co-op. Creamery, Lunenburg Cry. Ass'n,
Lunenburg, W. H. Colby, Maker.
47. Norton Creamery, Norton Mills, J. G. Turnbull Co.,
Orleans, Owners, G. A. Marsh, Maker.

FRANKLIN COUNTY.

Creameries.

48. Maple Hills Farms Creamery, East Berkshire, Maple
Hills Cry. Co., Leon Rouse, Mgr., J. A. Johnson,
Maker.
49. Missisquoi Valley Cry., Richford. (Details not known.)
50. Greens Corners, Creamery, St. Albans, R. D., J. G.
Turnbull Co., Owners, Orleans, T. Orne, Mgr.
51. Crystal Falls Creamery, Montgomery. (Details not
known.)

52. Wachusett Creamery, Enosburg Falls, E. H. Thayer & Co., Owners, E. E. Derby, Mgr.
53. Fairfax Creamery, Fairfax, G. J. Turnbull Co., Orleans, Owners, H. J. Conner, Maker.
54. West Berkshire Creamery, West Berkshire, C. D. Phelps, (Estate,) O. E. Goodhue, Maker.
55. Clover Leaf Creamery, East Fairfield, R. D. 2, C. O. Harvey, Prop. and Mgr., H. D. C. Smith, Maker.

Shipping Stations.

26. W. Whiting & Sons, St. Albans, H. E. Mooney, Mgr.
27. Maple Leaf Creamery, Swanton, E. Trahan, Prop. and Mgr.
28. Alden Bros., East Fairfield, C. Mack, Mgr.
29. Alden Bros., Sheldon, M. D. Mack, Mgr.
30. Hood's Plant No. 11, Sheldon Jct., H. P. Hood & Sons, Charlestown, Mass., G. C. Hodges, Mgr.
31. Hood's East Fairfield Plant, East Fairfield, H. P. Hood & Sons, Charlestown, Mass., T. E. Brady, Mgr.
32. Hood's Plant No. 10, Fairfield, A Marshall, Mgr.
33. Hood's Plant No. 14, Swanton, R. D. Byres, Mgr.
34. Hood's Plant No. 19, Highgate Ctr., N. E. Domey, Mgr.

Condensaries.

3. Federal Packing Co., Enosburg Falls., Federal Packing Co., Philadelphia, Owners, K. David, Mgr.
4. Hood's Condensary, St. Albans, H. L. Shore, Mgr.

GRAND ISLE COUNTY.

Creameries.

56. South Hero Co-op. Creamery, South Hero Co-op. Cry. Ass'n, A. E. Dodge, Maker.
57. Boston Jersey Creamery, Alburg, Boston Jersey Creamery Co., W. P. Morton, Local Mgr., R. W. Howard, Maker.
58. Grand Isle Co-op. Creamery, Grand Isle, Co-op. Cry. Ass'n, C. B. Vincent, Maker.
59. North Hero Co-op. Creamery, North Hero Co-op. Ass'n, B. E. Knight, Secy., Chas. E. Reay, Maker.

Shipping Stations.

35. Grand Isle Milk Station, Produce Dispatch of N. Y. City, Owners. A. J. Rickey.

LAMOILLE COUNTY.

Creameries.

60. Clovermead Creamery, Morrisville, C. J. Story & Son, Owners, G. E. Story, Maker and Mgr.
61. Mt. Mansfield Creamery, Stowe, Mt. Mansfield Cry. Ass'n, M. C. Lovejoy, Sec. and Treas., R. M. Metcalf, Maker.
62. Gold Brook Co-op. Creamery, Stowe, Gold Brook Co-op. Cry. Ass'n, Judson Santamore, Maker.
63. C. Brigham Co., Creamery, Cambridge Jct., M. C. Washburn, Mgr.
64. Gihon Valley Creamery, North Hyde Park. (Details not known.)

Shipping Stations.

36. Hood's Cambridge Creamery, Cambridge, Mgr.?
37. Hood's Plant, Wolcott, L. E. Jennings, Mgr.
38. Jersey Heights Creamery, Morrisville, C. L. Brown, Mgr.

ORANGE COUNTY.

Creameries.

65. Strafford Creamery, So. Strafford, Strafford Creamery Ass'n, W. B. Stone, Maker.
66. Green Mountain Creamery, West Topsham, Green Mt. Cry. Ass'n, Waldo E. Hood, Maker.
67. Randolph Co-op. Creamery, Randolph, Randolph Cry. Ass'n, A. E. Johnson, Maker.
68. Washington Co-op. Creamery, Washington, Washington Co-op. Creamery Ass'n, P. E. King, Maker.
69. Farmers Co-op. Creamery, East Corinth, Farmers Co-op. Creamery Ass'n, L. A. King, Maker.
70. Topsham Co-op. Creamery, Topsham, Topsham Co-op. Cry. Ass'n, C. E. McLan, Maker.
71. Wells River Co-op. Creamery, Wells River, Wells River Co-op. Cry. Ass'n, H. E. Lyster, Maker.
72. Orange County Creamery, Chelsea, Orange County Cry. Ass'n, L. R. Brown, Maker.

73. West Fairlee Creamery, West Fairlee, Lyndonville Cry. Ass'n, Lyndonville, F. R. Haywood, Maker.
74. North Randolph Creamery, North Randolph, H. P. Hood & Sons, Charlestown, Mass., A. E. Colburn, Maker.
75. Williamstown Creamery, Williamstown, Lyndonville Cry. Ass'n, Lyndonville, A. H. Jewett, Maker.
76. Tunbridge Creamery, Tunbridge, Tunbridge Co-op. Cry. Ass'n, Roy Montgomery, Maker.
77. Vershire Creamery, Vershire, operated by Geo. H. Sumner, L. S. Flint, Maker.

Cheese Factories.

10. Bradford Creamery, Bradford, Lyndonville Cry. Ass'n, Lyndonville, F. H. Bickford, Supt.

Shipping Stations.

39. Brigham Station, Randolph, C. Brigham Co., Cambridge, Mass., J. J. Stimets, Mgr.
40. Boston Jersey Creamery, No. Thetford, Boston Jersey Cry., Boston Mass., J. B. Broadhead, Mgr.
41. Newbury Creamery, Newbury, Lyndonville Cry. Ass'n, Lyndonville, G. A. Doe, Mgr.
42. Hood's Milk Station, Fairlee, E. H. Linden, Mgr.
43. Hood's Milk Station, Boltonville, A. E. Domey, Mgr.
44. Highland Creamery, West Newbury, The Plymouth Cry. Co., Boston, Owner, J. W. Layton, Mgr.
45. Corinth Creamery, Corinth, Controlled by Lyndonville Cry. Ass'n, F. D. Little, Mgr.

Condensaries.

5. Hood's Randolph Condensary, Randolph, L. F. Butman, Mgr.

ORLEANS COUNTY.

Creameries.

78. Orleans Creamery, Orleans, J. G. Turnbull Co., Orleans, L. M. Kingsley, Mgr., B. E. Wilson, Maker.
79. West Charleston Creamery, W. Charleston, J. G. Turnbull Co., Orleans, J. G. Eley, Mgr.
80. Derby Line Creamery, Derby Line, J. G. Turnbull Co., Orleans, V. G. Marshall, Maker.

81. Coventry Creamery, Coventry, J. G. Turnbull Co., Orleans, H. S. Bridges, Maker.
82. Lowell Creamery, Lowell, J. G. Turnbull Co., Orleans, B. N. Durasha, Maker.
83. Troy Creamery, South Troy, J. G. Turnbull Co., Orleans, Floyd J. Miller, Maker.
84. Albany Creamery, Albany, J. G. Turnbull Co., Orleans, S. B. Paige, Maker.
85. Clyde River Cry., E. Charleston, J. G. Turnbull Co., Orleans, Geo. Fox, Maker.
86. Black River Creamery, Craftsbury, K. H. Bishop, Maker, W. S. Bean, Lowell, Mass., Prop.
87. Jersey Star Creamery, Irasburg, Jersey Star Creamery Ass'n, H. F. Bover, Maker.
87. Green Mountain Creamery, North Craftsbury, R. F. D., J. A. Dutton, Prop., Fred Estell, Maker.
88. Meadow Brook Creamery, West Glover, N. C. Stevens, Prop., E. G. Ford, Maker.
89. Caspian Lake Creamery, Greensboro, F. A. Messer, Montpelier, Prop., W. B. Bates, Maker.
90. Holland Creamery, Derby Line, R. F. D., Sommer's Cry. Co., Springfield, Mass., H. M. Gray, Maker.
91. Westfield Creamery, Westfield, H. P. Hood & Sons, Boston, Mass., H. A. Larabee, Maker.
92. Columbia Creamery, North Troy, H. P. Hood & Sons, Boston, Mass., G. E. Morse, Maker.

Shipping Stations.

46. Crystal Lake Creamery, Barton, H. P. Hood & Son, Boston, Mass., Mr. French, Mgr.
47. Newport Center Creamery, Newport Center, G. J. Turnbull Co., Orleans, C. I. Hartwell, Mgr.
48. Derby Creamery, Derby, J. G. Turnbull Co., Orleans, J. E. Onsboro, Mgr.

Condensaries.

6. Hood's Newport Condensary, Newport, H. P. Hood & Sons, Boston, Mass., H. L. Alexander, Mgr.

RUTLAND COUNTY.

Creameries.

93. Champlain Valley Creamery, Fair Haven, Tait Bros., Fair Haven, F. E. Ricker, Maker.

94. West Rutland Creamery, West Rutland, C. W. Lamphere, Prop. and Maker, small plant in connection with grocery store.
95. Hortonville Creamery, Orwell, R. F. D., Tait Bros., Fair Haven, Owners, F. L. Giddings, Maker.
96. Otter Creek Creamery, Brandon, R. F. D., Jones Bros., Owners, E. W. Parent, Maker.
97. Proctor Creamery, Proctor, Vermont Marble Co., Owners, S. L. Harris, Maker.

Shipping Stations.

49. Rutland County Creamery, Brandon, Alden Bros., Boston, Mass., Owners, P. O. Eddy, Mgr.

Cheese Factories.

11. Gleason Cheese Factory, Cuttingsville, F. L. Russell, Prop., W. E. Bruce, Maker.
12. Lewisville Cheese Factory, Wells, Lewisville Cheese Co., C. K. Beebe, Maker.
13. Union Cheese Factory, Middletown Springs, Union Cheese Co., J. L. Smith, Maker.
14. West Pawlet Cheese Factory, West Pawlet, C. N. Kine, Maker and Mgr.
15. Stone's Cheese Factory, East Wallingford, W. C. Stone, Prop.
16. Riverside Cheese Factory, West Rutland, Smithtown Cheese Co., G. H. Baker, Maker.
17. Cold River Cheese Factory, So. Clarendon, R. F. D., F. E. Plumley, Prop.
18. Eureka Cheese Factory, Middletown Springs, R. F. D., Floyd Pratt, Maker.
18. Blakely Cheese Factory, Pawlet, Frank Blakely, Prop., W. A. Lapoint, Maker.
20. Mt. Holly Cheese Factory, Cuttingsville, W. E. Aldrich, Prop., N. T. Trench, Maker.
21. A. W. Crowley Cheese Factory, Belmot, A. W. Crowley, Prop. and Maker.
22. Aldrich Cheese Factory, Cuttingsville, W. E. Aldrich, Prop., G. A. Woodbury, Maker.
23. East Poultney Cheese Factory, East Poultney, E. Poultney Cheese Co., E. W. Merriman, Maker.
50. Llanwhitkell Farm Creamery, Mt. Holly, N. P. Cooch, Prop., H. D. Smith, Mgr.

51. Brigham Tinmouth Station, P. O. Wallingford, C. Brigham Co., Cambridge, Mass., Owners, C. J. Wilbure, Mgr.
52. Brigham's Plant, Wallingford, C. Brigham Co., Cambridge, Mass., Owners, R. O. Bugbee, Mgr.
53. Brighams Plant, Danville, C. Brigham Co., Cambridge, Mass., Owners, C. L. Graves, Mgr.
54. Brigham's Plant, South Wallingford, C. Brigham Co., Cambridge, Mass., Owners, A. W. Needham, Mgr.
55. Brigham's Plant, Danby Four Corners, C. Brigham Co., Cambridge, Mass., Owners, L. B. Davidson, Mgr.
56. Castleton Milk Plant, Castleton, Castleton Dairy Co., Castleton, Owner, J. Woodbury, Mgr.
57. Castleton Dairy Co., West Pawlet, H. Juckett, Mgr.
58. Tait Bros., Milk Plant, Fair Haven, Tait Bros., Springfield, Mass., Owner, J. J. Jackson, Mgr. Destroyed by fire May 5, 1917.
59. Maple-Hurst Creamery, Benson, Tait Bros., Springfield, Mass., Owners, J. A. Wells, Mgr.
60. Borden's Milk Plant, Poultney, Borden Condensed Milk Co., D. E. Decker, Mgr.
61. Sheffield Farms Slawson Decker Co., Florence, J. A. Aubrey, Mgr.
62. Smith's Creamery, Fair Haven, Jacob Smith, 590 Water St., N. Y. City, Owner, W. Stebbins, Mgr.
63. Benson Landing Cream Plant, Benson Landing, Westport Creamery Co., Westport, N. Y., Owners.
64. Springfield Creamery, Middletown Springs, F. B. Allan, Springfield, Mass., Prop., Walter Hill, Mgr.
65. Swale Skimming Station, Swale, Tait Bros., Fair Haven, Owners.

WASHINGTON COUNTY.

Creameries.

98. Montpelier Creamery, Montpelier, J. G. Turnbull Co., Orleans, Owners, Herb Gillette, Mgr.
99. Worcester Creamery, Worcester, J. G. Turnbull Co., Orleans, Owners, Earl Wallice, Maker.
100. Marshfield Co-op. Creamery, Marshfield, Marshfield Co-op. Cry. Ass'n, C. M. Lilly, Maker.
101. Cobble Creamery, Barre, Cobble Hill Creamery Co., C. E. Tracy, Maker.
102. Barre Creamery & Cold Storage Co., Barre, F. G. Pearson, Mgr., E. J. Talbut, Maker.

103. Winooski Valley Creamery, Waterbury, A. G. & G. F. Brailey, Fair Haven, Mass., Owners, E. E. Grant, Mgr., G. F. Averill, Maker.
104. No. Montpelier Creamery, No. Montpelier Creamery Ass'n, No. Montpelier, E. C. Hillis, Maker.
105. East Montpelier Creamery, East Montpelier, East Montpelier Co-op. Cry. Ass'n., John Bond, Maker.
106. Bryant's Creamery, Northfield, A. E. Bryant, Prop. and Mgr., H. R. Seaver, Maker.
107. East Calais, Co-op. Creamery, E. Calais Co-op. Cry. Ass'n., E. Calais, Guy Bancroft, Maker.
108. Cabot Creamery, Cabot, F. A. Messer, Montpelier, Prop., T. H. Osgood, Maker.
109. Warren Co-op. Creamery, Warren, Warren Co-op. Cry. Ass'n, H. N. Paquette, Maker.
110. Mad River Valley Creamery, Waitsfield, N. E. Belden, Prop., W. H. Wright, Maker.

Shipping Stations.

66. Stafford's Creamery Co., Montpelier, C. H. A. Stafford & Sons, Morrisville, Owners, C. H. Goodrich, Mgr.
67. C. Brigham Creamery, Waterbury Ctr., C. Brigham Co., Cambridge, Mass., Owners, F. A. Colson, Mgr.
68. Borden's Station, Waterbury, Borden Condensed Milk Co., Richmond, Owners, C. D. Olive, Mgr.
69. Moretown Creamery, Moretown, Moretown Cry. Co., Owners, F. H. Sawyer, Mgr.
70. Middlesex Creamery, Middlesex, Moretown Cry. Co., Owners, B. L. Palmer, Mgr.
71. Plainfield Creamery, Plainfield, Deerfoot Dairy Co., Boston, Mass., C. B. Story, Mgr.

WINDHAM COUNTY.

Creameries.

111. North River Creamery, Jacksonville, North River Cry. Ass'n, Edwin S. Murdock, Maker.
112. Deerfield Valley Creamery, Wilmington, Deerfield Valley Creamery Ass'n, F. A. Rist, Maker.
113. Windham County Creamery, Newfane, Windham County Cry. Ass'n, C. A. Nichols, Maker.
114. Wardsboro Creamery, Wardsboro, Wardsboro Cry. Ass'n, Miss Hannah Halonen, Maker.

115. West River Creamery, South Londonderry, West River Cry. Co., W. C. Hall, Maker.
116. Valley Creamery, Westminster, C. M. Comstock, Prop. and Maker.
117. Holbrook's Creamery, Townshend, H. I. Holbrook, Prop. and Maker.
118. Guilford Co-op. Creamery, Brattleboro, R. F. D. 3, Guilford Co-op. Cry. Ass'n Inc., F. C. Bates, Maker.

WINDSOR COUNTY.

Creameries.

119. Elm Valley Creamery, Cavendish, Belknap & Sons, Cavendish, Owners, D. H. Belknap, Maker.
120. Hood's Creamery, Woodstock, H. P. Hood & Sons, Boston, Mass., Owner, S. C. Spaulding, Mgr.
121. S. Royalton Creamery, So. Royalton, H. P. Hood & Sons, Boston, Mass., Owners. Maker?
122. Middle Valley Creamery, East Bethel, M. J. Buck, Prop., D. P. Green, Maker.
123. White River Creamery, Rochester, Stimets & Mussey, Owners, R. H. Holland, Maker.
124. Maplehurst Creamery, Stockbridge, J. H. Mussey & J. J. Stomets, Owners, J. H. Mussey, Maker.
125. Silver Lake Creamery, Barnard, F. E. Allen, Prop., F. H. Adams, Maker.
126. S. & F. Creamery, South Royalton, F. E. Fowler, Prop., Gray Maker.
127. Moore's Creamery, South Royalton, H. F. Moore, Prop. and Maker.
128. Harrington Creamery, Bethel, H. R. Densmore, Prop. and Maker.
129. Sherburne's Creamery, No. Pomfret, A. E. Sherburne, Prop. and Maker.
130. Sharon Co-op. Creamery, Sharon, Sharon Co-op. Creamery As'n, W. C. Porter, Maker.
131. West Hartford Creamery, West Hartford, A. L. Dow, Prop. and Maker.
132. Woodland Creamery, No. Pomfret, J. A. Burbank, Maker. Small farm creamery.

Cheese Factories.

24. Plymouth Cheese Factory, Plymouth Cheese Co., S. C. Aldrich, Maker, Creamery and Cheese.

25. West Windsor Cheese and Creamery Factory,
Brownsville, M. Winor Co., Boston, Prop., B. C.
Currier, Maker. (Ship cream and soft cheese.)

Shipping Stations.

71. D. Whiting & Sons, Hartland Four Corners, C. O.
Jackson, Mgr.
72. D. Whiting & Sons, Ascutneyville, C. S. Gardner,
Mgr.
73. Hood's Station, Norwich, H. P. Hood & Sons, Boston,
Mass., R. J. Patterson, Mgr.

SUMMARY.

There are 236 plants in the state.
Of these 132 are butter manufacturing plants.
73 are shipping stations.
25 are cheese factories.
6 condensaries.

REPORT
OF THE PROCEEDINGS OF THE
FORTY-EIGHTH ANNUAL CONVENTION
OF THE
VERMONT
DAIRYMEN'S ASSOCIATION

HELD AT
THE ARMORY, BURLINGTON, VT.

January 15, 16, 17, 1918



St. Albans, Vt.
St. Albans Messenger Co. Print
1918

**OFFICERS OF THE VERMONT DAIRYMEN'S
ASSOCIATION.**

PRESIDENT.

F. H. Bickford.....Bradford

VICE-PRESIDENTS.

S. L. Harris.....Proctor,
C. C. Gates.....North Hartland.'

SECRETARY.

O. L. Martin.....Plainfield.

TREASURER.

M. A. Adams.....Derby.

AUDITOR.

F. L. Davis.....Hartford.

PROCEEDINGS OF THE 48th ANNUAL MEETING OF
THE VERMONT DAIRYMEN'S ASSOCIATION

THE ARMORY, BURLINGTON, VERMONT, JANUARY
15, 16, 17, 1918.

Had a rigid military censor blue-penciled the program of the 48th annual convention of the Vermont Dairymen's Association which was scheduled to convene Tuesday afternoon, it could not have been deleted into a less recognizable state than was easily accomplished by the fall of snow. No session was held in the afternoon but in the evening the convention was opened by rather an informal ceremony presided over by Vice-President O. L. Martin. The session was preceded by an orchestral concert given by The Lessors, in their usual delightful style.

THE WARTIME PROGRAM OF THE EXTENSION SERVICE.

BY THOMAS BRADLEE, DIRECTOR EXTENSION SERVICE,
UNIVERSITY OF VERMONT AND STATE AGRICULTURAL COLLEGE.

I want to outline briefly the present program of the Extension Service of the College of Agriculture of the University of Vermont for two reasons. First, because of the active part this association has taken in helping to organize extension work in Vermont, as evidenced in several of your annual reports outlining the original policies of the Extension Service, indicating that you were a fore-runner, paved the way and did pioneer extension work.

In the second place, there seems no better time nor place than this to set forth our plans for the coming year, for surely here we meet our most progressive farmers upon whom we must depend for leadership, men whose confidence and co-operation we need if effective extension work is to be done.

In arranging our war program, we have endeavored to center our energies around those farming enterprises which will help this Nation to meet the present emergency. It covers very few things that would not be found on a peace-time program, but during this emergency some enterprises will receive more attention than ordinarily. It not only includes the staple crops needed for human consumption and for stock feeding, dairying, poultry for meat and eggs, sheep and swine production, but also the various phases of conservation in the home, on the farm and elsewhere; and it is expected to lend as much assistance as possible to towns and cities wishing to undertake garden and poultry and other production and conservation campaigns.

Doubtless you will be more interested in the scheme of operation, whereby we expect to carry information to farmers this spring, than in details. We expect to continue co-operative relationships with the Public Safety Committee, the Food Administration, the State Department of Agriculture and any other agency which has a real function to perform in the production and conservation pro-

gram. We propose to work throughout the State, in all the counties, so as to take advantage of the present distribution of labor. If labor were plentiful, we could probably increase production more rapidly by intensive work in certain sections of the State where soils are more tractable than others. But labor is the limiting factor in production this year, and we are trying to make our plans so as to take advantage of all that is or will be available.

The extension staff comprises an assistant county agent leader; twelve farm bureaus, each co-operating in the employment of a county agent; four assistant emergency demonstration agents; a leader of boys' and girls' club work and his assistant; a home demonstration agent leader; two home demonstration agents (five more counties are organized for co-operation in the employment of home demonstration agents); three part-time dairy specialists; demonstration agents); three part-time dairy specilists; one part-time horticultural specialist; one half-time poultry specialist; one sheep specialist, giving half his time to Vermont and half to New Hampshire; a poultry specialist; a labor specialist and a pig club specialist, each employed on a like basis; one farm management demonstrator and his assistant; one full-time and one part-time home economics specialist.

These workers are classified under four heads: the county agents, dealing largely with production; the boys' and girls' club workers, dealing with both production and conservation; the home demonstration agents, dealing in a limited way with production, but more largely with conservation; and, last but not least, the large group of specialists who will supplement and strengthen the work of the other three groups.

Through the courtesy of Dr. M. B. Hillegas, State Commissioner of Education, we are assured that the services of the special teachers of agriculture and of home economics will be available to assist the county agents and home demonstration agents in carrying out our program within their communities in so far as this may be done without interference with their school work.

In carrying out this program, we have the full support of the Food Administration along the lines suggested by Hon. David Houston, Secretary of Agriculture, in an address at a recent meeting of the State Agricultural Colleges and Experiment Stations in which he said:

"In a broad way, it is agreed that the prime function of the Department of Agriculture shall be the stimulation of production, the conservation of products on the farm through all the normal and approved processes, the promo-

tion of better marketing and distribution of products from the farms to the markets, the prosecution of the work in home economics along usual lines, the dissemination of information, and the extension of all these activities as authorized by law. In a similar way, the principal function of the Food Administration is the control and regulation of commercial distribution of foods, that is, of products which have reached the markets, are in the channels of distribution or in the hands of consumers, their conservation by consumers, the elimination of waste, and the handling of foods and feeds in the market by legal means through its regular officials as well as through its volunteer agencies. In the main, the Department of Agriculture deals with all the processes of farming up to the time products reach the market, till they are in the requisite form for consumption and are available for the purpose. At this point the Food Administration enters and exercises its wide powers of regulation, direction, and suggestion."

The State Commissioner of Agriculture and the Extension Service from the beginning have worked in close co-operation and yet closer relations and more effective results are confidently predicted.

We have tried to meet the wishes of the Public Safety Committee by shaping our program along broad lines intended to cover the essential enterprises in production and conservation in such a way as to accomplish the fullest results by means of co-operation and with as little duplication of effort as possible.

AYRSHIRE SESSION.

PRESIDENT WINSLOW, PRESIDING.

ADDRESS DELIVERED BY R. B. COOLEY BEFORE THE VERMONT
DAIRYMEN'S ASSOCIATION AT BURLINGTON, VT.,
JANUARY, 1918.

Mr. Chairman, Ladies and Gentlemen:

It gives me profound pleasure to be invited to speak before a gathering of farmers and particularly among those men whose interests center around the good old Scottish breed of dairy cattle, the Ayrshire. I feel that I must congratulate the Vermont Dairymen's Association for setting apart a definite time during the convention for various dairy breeds to be exploited. Meetings of this nature fill a place in the life and activities of an organization such as yours in that they serve to promote good fellowship, in addition to the interests of the breed which the meeting represents. I have been asked to say something of the Ayrshire as the farmers' dairy cow.

This breed is perhaps the youngest of the four dairy breeds in America and has its origin in the county of Ayr, Scotland. Although the youngest dairy breed in America it has been in good standing for some 200 years, has satisfied the frugal Scotchman and has made steady advancement in America for over 80 years. Although this breed has not been exploited and advertised by such horn-blowing or bombastic methods as have some of the other dairy breeds, yet Ayrshires, on account of their inherent virtues and adaptability to various climates, have reached an enviable standard of excellency contributing much to the dairy interests of the United States, Canada, New Zealand, Australia, India, Russia, and Asiatic countries.

It may be well to allude to the life work of our predecessors in Ayrshire development—the Ayrshire men of Scotland. Among the main reasons for their success were persistency and uniformity of purpose. We cannot help but remember the achievement of such men whose patient and persevering effort has made possible the work you people here in Vermont are doing toward Ayrshire improve-

ment. Their attainment has been reached by steady persevering effort and uniformity of purpose handed down from one generation to the next. There is a particular thoroughness which characterizes their work and of itself makes for success. The improvement of the Ayrshire has been the Scotchman's life work, and marvelous progress has been made by gradually eliminating the breed's defects and at the same time strengthening their excellencies.

These thoughts may well be taken to heart by American breeders. It is important that Ayrshire education disseminated among beginners and the younger generation have thoroughly incorporated into it, those principles which have led to success among Scottish breeders.

PROSPECTS AND DEMAND FOR AYRSHIRES.

It is said from good authority that no children under six years old are now living in Belgium. The reason given is that there is no milk available there for growing children. Other devastated parts of Europe are growing to be like Belgium. It seems to me safe to predict that by the end of this war many of the European countries which have contributed liberally toward our imported cattle will be compelled to import dairy cattle from the United States. On account of the Ayrshire's beauty, hardiness and all around satisfactory dairy cow performance I am confident the call for Ayrshires from Europe will make it worth while for Vermont dairymen to start at once increasing the number and quality of their herds.

There is no hoarding of livestock on the American continent—in fact in the world. Vast quantities of wheat is said to be stored in Australia and as soon as congested transportation is relieved, many of those commodities which we find to be scarce, will become plentiful. Moreover, grain crops can be produced in one year, but you cannot produce a matured cow in that time.

SELECTION OF THE HERD.

Whether or not the average farmer should be encouraged to start with grades or purebreds is a matter for himself to decide. Through proper selection, management and feeding, a grade herd of Ayrshires may be made to produce practically as much milk in a year as the same number of purebreds, although the young stock sold for breeding purposes will never be as valuable. The main thing to remember in starting a herd is to lay a good foundation. I would far rather spend a certain sum of money in

starting the right foundation, even though the number of animals were small, than to be guilty of starting with a far larger number of individuals showing many of the outstanding qualities which contribute toward uneconomical milk production. There is a chance for success where a good foundation is laid but none whatever where the selection has been careless.

Too much emphasis cannot be laid upon the selection of the sire. Above all things he must be purebred, a good sized, strong constitutioned individual with a uniform high producing number of ancestors back of him. I think altogether too many farmers are careless in the selection of sires used in the herd.

When it comes to the selection of females it is not well to pay too much attention to fads and fancies. These are of a passing nature, changing frequently and to the average farmer they are not in his best interests to follow. We have said that Ayrshires are noted for their beauty. Young breeders are sometimes inclined to select individuals, having in mind "form" rather than "perform." This is perhaps more commonly done among Ayrshire men than among followers of other breeds. Those tight, level udders and thick forms with all that goes with them have been carried to extremes in certain sections of the country. It is not in the best interests of the beginner to establish that particular type in his mind as being superior to the rangy, deep-bodied open conformation cow. It is always well for a man to be honest with himself and this applies as much in the selection of the dairy herd as it does in any other line of business. In the selection of his herd he must recognize breed defects as well as virtues, selecting his herd with both in mind.

GREATER CONTINUITY IN BREEDING REQUIRED.

Glancing at the great mass of our American herds we cannot fail to be impressed with the mixed collection of females employed in almost every instance. It is extremely seldom that we find a breeder endeavoring to establish a particularly definite type. So many seem to be just staggering along in the dark with a bull of this blood this year and one representing a totally different family the next. While culling from and adding to his herd of cows not because of any particular end in view but because he can sell some to better advantage than others, leaving a cash margin in his pocket. How many herds of Ayrshires are there in this country or in this state where all the females have been selected outside or retained from within,

because of some peculiar physical qualification? Then how about the sire? How many of our breeders have deliberately figured out what bull they wanted to use and why they set steadily forward to intensify the blood and the qualifications sought through a long series of generations? Did any one here ever hear of a breeder who succeeded in turning out a high class, uniform contribution of Ayrshires by any such loose, hap-hazard method of mating?

COMMUNITY CENTERS.

Community breeding has many things to recommend it and should be practised more in this state as well as throughout all New England. Through years of experience and as a result of mature judgment, the Scottish breeders have co-operated in planning important work in the use of sires of proven worth. In this work certain men stand out as mountain peaks in the life of their communities. This same development work in the form of community centers can as well be developed right here among you breeders in Vermont. I have in mind where two or three or more farmers, none of whom feel financially able to buy a good pure-bred bull of excellent breeding and production back of him but on account of having some well bred cows, desire to make use of such a bull. These men through buying such co-operatively can very well make use of him in the development of young stock superior to their dams. This could be accomplished at a much less expense were each man to buy a bull of as good breeding and individuality. This community idea of breeding has worked out successfully in several localities in this country and there is no real good reason why men inclined to work well together could not achieve success right here in the State of Vermont.

ADVANCED REGISTRY.

After the herd has been improved through better breeding, feeding and general development it would surely be a mistake not to keep close milk records of the improved stock. The system of advanced registry which has for several years been in vogue among purebred Ayrshire breeders is one of the best system of identifying cows with good breeding that are actually high producers. All well bred cows are not high producers, therefore, some system of locating those that are high producers is necessary for best results. Recent results in advanced registry work show one Ayrshire cow with a six year accumulated average production of 10,630 pounds. Another with a five year accu-

mulated average production of 13,866 pounds, and still another with a three year accumulated average of 16,474 pounds. Best of all comes another with a nine year accumulated average of 10,372 pounds. No one can question the advisability of obtaining such valuable records as these have proven to be. The increased value of young stock offered for sale to say nothing of anything else will pay handsomely for any expense and trouble connected with obtaining such records. You men, whether established in the Ayrshire business or beginning, will do well to look carefully into the advanced Registry work and participate if you think after careful judgment that your herd would be improved by taking a part in the work.

PUBLIC SALES.

There have been a few public sales of Ayrshires throughout New England during the past few years and several good individuals have been contributed from breeders here in Vermont. However, I am confident that more sales always showing the carefully selected group of individuals can not help but bring excellent returns to the men who consigned good individuals. The public sale has an educational value not fully accredited. It is one of the best means of promoting Ayrshire interests. Next to the show ring it is the chief means of educating the public to higher standards and higher appreciation of Ayrshire excellence. I would urge you men young in the business to co-operate in sending your stock in carload lots to the New England Ayrshire sales and in that way accomplish the same end much cheaper than if each were to ship separately. As a final word I should like to impress upon you men the importance of not only keeping more Ayrshires but also the importance of keeping better ones. Throughout the United States there is just one Ayrshire for every 112 farms. Vermont can boast of more Ayrshires per farm than this but with as many as you have and as good as they are, improvement is possible.

By President Winslow:

In one remark you made, Prof. Cooley, it occurred to me that possibly the advanced registry test of cows would bring out in the breeding of these animals a condition that would injure rather than help them. Will you explain to us something about that?

By Prof. Cooley:

In reply to that question: I try not to be an extremist; I really don't believe in extremes. I think that the members of the Ayrshire Breeders' Association in their policy, have shown great wisdom in this one particular respect, among others, and that is, you have never encouraged short-time tests of Ayrshire cattle. I don't believe in short-time tests because there is a great inclination on the part of many people to over-work an animal and I have seen animals of various breeds permanently ruined from over work on a 7 or even 30 day test. I have always held that that was one of the excellent features of the advanced registry system of the Ayrshire Breeders' Association, that they did not encourage that short term work. On the other hand, where young cattle are well grown and freshen at 30 instead of 21 or 23 months and are tested under ordinary good conditions, I think that kind of testing is of great advantage in developing the dairy inclinations of an animal, and also of showing the public where the good cows are. I do not think that crowding young stock to make large records in a short time is fair to the animal or to her owner. I believe one of the reasons why among some of our dairy breeds we have a large proportion of small animals and the number becoming larger each year, is because of short-time tests and because of too early breeding and under feeding. The work has been too hard on the individuals and in that case advanced registry work has not been beneficial. But I do say that advanced registry work has everything to recommend itself, provided it is properly done, and I also believe that the policy outlined and followed by the Ayrshire men has a better effect upon the animals than the policy of other breeders.

WEDNESDAY FORENOON SESSION.

Jan. 16, 1918.

PRESIDENT BROOKS, *Presiding.*

ADDRESS OF WELCOME.

BY JAMES P. TAYLOR,

SECRETARY OF THE GREATER VERMONT ASSOCIATION.

On account of his absence from the city Mayor Jackson has requested me (for him) to present to you the freedom of the Queen City of Vermont.

This year we can extend to you a special welcome, a very fraternal greeting, for Burlington is interested in dairymen and the dairy business more than ever before. Since your meeting here last year, a great industry has been located in the City of Burlington:—The Vermont Milk Chocolate Company, the superlative merit of whose product is founded in the special virtues of the milk produced in the Green Mountain State. Climate, soil, the very scenery itself, united with the dairy skill and interest represented by the Vermont Dairymen's Association unite to make the name Vermont a symbol for the best in dairy products.

It is highly significant for the future that business men in their moves to develop Vermont industry should turn to the field of manufacturing food products. So that Vermont shall receive two profits from the handling of the output of the farm.

More and more Vermont farmers and other business men will co-operate to capitalize the good name of Vermont by making the highest quality of manufactured food products.

We welcome you not merely because there is now a more intimate fraternal feeling but also because it is an honor for a Vermont city to have within its gates so large, so historic an organization, notable among Vermont organizations and one of the most effective, if not the most effective state, dairymen's association in the United States.

You have shown what organization can do in developing a dairy state. As a result of your continual crusade for better things we hope that soon Vermont scenery will not be disfigured by a single herd of miscellaneous cattle. ill-assorted, ill-fated scrubs. We hope that our valley and mountain landscapes will be beautified everywhere by herds of pure bred stock, with a great ancestry and a great promise of making Vermont the market for the most productive and most healthful pure bred dairy cattle in the United States. We hope that you will hasten the tendency to assemble each breed in the distinctive region best adapted to it, so that the development and improvement of the different breeds can be speeded up by the close fraternal working together of men with a common purpose and a common enthusiasm in the special region, devoted to the sacred animal at home in that region. Then a buyer can make a pilgrimage through Vermont from center to center and economically, quickly, and most profitably to us, provide himself with the best stock in the world.

We welcome you because we feel that this organization presents an eternal proof that Vermonters can organize for the most effective team play. The history of your cow testing associations shows that Vermont can co-operate and can lead in the nation. Accepting the idea of the cow test association from Denmark, you established them throughout Vermont, so that this little state until recently had more cow test associations than any other state in the Union. Following along after the Green Mountain State, the vast states of New York and Wisconsin now have by count more organizations. However, in proportion to population little old Vermont still has five times as many as any other state in the Union. Your development of cow test associations has been followed by the organization of co-operative creameries, classic examples which are studied again and again by delegations from other states. In the formation of the county agricultural associations and in the support of county agents you are the men who made it possible for Vermont to set the pace. All the signs of the times indicate that in the future success in business will hinge upon the increase of organized co-operative activity. In what you have done, in what you promise to do, Vermont dairymen convince us all that Vermont business men can put up a team play second to none, even though it is conventionally supposed that Vermonters are extravagantly insistent on individuality and independence. The first century of Vermont history has been styled "a study in independence." For the last twenty-five years your work has been to make it inevitable that the second century of

Vermont history shall be known as a century of team play and co-operation.

We welcome you as a war convention which will stimulate the state to more intense and soldierly activity on our own soil. During these days every live patriotic organization which wishes to justify its own existence and in fact, to insure its own existence, must be a war convention. Its thought must be directed first of all to the problem of deciding just what it may do to accomplish the supreme object, which is the only object now, of private and public life, the winning of the war. The great slogan, "Food will win the war", the great fact, that our problems are vaster and more tragic because Italy has suffered disaster and Russia has apparently withdrawn largely because food problems were not adequately handled, this great slogan and this great fact, put you food producers on the firing line and thrill you with a sense of fateful responsibility. In the estimating of the efficiency of whole nations pitted against each other the efficiency figures for every man, woman, and child are a determining part of the score. You are each one of you one of the hundred million which will win the victory. Back in 1913 a German said, "Victory, at the next clash, will belong to the Nation the most exact, by which I mean the one whose servants, from the highest to the lowest, are exact to fulfill their duty, be it the highest or the lowest."

This is a great truth which must be brought home to every one. The war is to be won by specialists. Burlington welcomes you as a war convention of specialists on food production and food conservation. We hope to see you set the pace in food production and in food conservation in perfect loyalty to the appeals of the United States Department of Agriculture and to the Food Administration.

Burlington welcomes you as a war convention whose deliberations and resolves will be so significant that we will realize, as you realize, that this is not merely a meeting of Vermonters in Vermont, but a war convention of American citizens in America, and as well a line-up of soldiers of world freedom who formally or informally send an oath of allegiance to President Wilson and our associates in the war and a challenge to the Kaiser.

RESPONSE TO ADDRESS OF WELCOME.**BY VICE-PRESIDENT MARTIN.***Members of the Vermont Dairymen's Association,
Ladies and Gentlemen:*

We meet under different circumstances than ever before, but I gladly rise to this welcome presented by the City of Burlington. I believe last year one of the citizens of the "Queen City" diagnosed our case as being "Burlingtonitis", or too much Burlington. We have not, you see, fully recovered from the malady even in a twelvemonth, but perhaps if the growing towns in the State continue to improve their facilities we will eventually recover.

We are a War Convention as Mr. Taylor has said, but I think there is much to be said from the farmers' standpoint. I doubt if the business men, who are doing much for the farmer at the present time, are alive to the real situation. In fact, I doubt if the powers who are in charge of the great wheels of the Government are fully alive to the actual conditions that confront the farmer of to-day. One year ago we were admonished by the Government to *produce, produce, produce*, and the farmers responded to that admonition to a man. The fact is plainly shown by the enormous harvest that was brought forth in the autumn months. We were told in the spring that if we would plant large acreages of potatoes we would be assured of a reasonable profit. The high prices of seed and fertilizers and farm labor made the potato crop in Vermont cost probably not far from a dollar and a half a bushel. There are cellars and storage places pretty well filled with potatoes to-day and the price paid for same ranges from 85c to \$1 a bushel. I will leave it for you to say whether that is encouraging for a farmer who invested his money and credit in high priced seeds to further put forth his efforts to produce a bountiful crop another year. Butter at the present time is 25% higher than it was one year ago to-day while the feeds with which the farmer produces that butter are from 100 to 300% in advance of what they were a year ago. Only 2 or 3 days ago I read in a Boston paper that the price of June butter had been fixed at 45c. We have not heard a word said about the price of feeds that made that butter or will make the butter to replenish the storage

houses. We have not heard one word about any price being fixed to regulate the price of feeds to put them within the grasp of farmers to enable them to refill the storage houses. On the other hand, we read in the papers that President Gompers—it does not advise us whether he is President of the United States or not—but President Gompers has allowed that there should be no more strikes in the construction of government property. Now, as I understand it, there is but 10% of our population members of organized labor in the United States and yet we read of an arrangement with the government whereby that 10% will be good and allow the government to proceed with its plans and allow the war to continue, and the farmer is doing his own work with what little help he can get and we hear him not saying a word. He is producing to his utmost with what he has to do, without a representative of the farmer class on any administrative board that I know of who has to do with our government. It seems to me with this great aggregation of producers and not one representative on our administrative boards while 10% of the labor of the country is organized and dictating terms to Uncle Sam, there is something wrong. I believe there is a feeling in the inmost heart of hearts of the farmers that they are not getting quite the square deal in this matter of food production. I don't believe that the country can go on asking the farmers to do impossible things and then pay absolutely no attention to the reasons why they can't do these things. We are charitable, long-suffering, slow-to-anger people and I don't believe you will hear a growl. I think the farmer will do what he can do and the result will be that he will reduce his operations to the extent of what he can do with his own hands, and the effect of it, I am fearful, will be beyond what anybody can realize.

I don't know what to offer as a suggestion but I know something should be done to utilize the acres that will lie uncultivated or cultivated to the extent of perhaps one man's work the coming year. I am afraid it is going to be just as Brother Taylor said, "effective in the wrong way." I wish this convention would take this matter up in a sort of a discussion and perhaps introduce resolutions which would show the feeling of Vermont agriculturists toward the labor situation, and present these resolutions to our delegation in Congress that they may know that a grave situation is likely to arise.

Perhaps I have talked more seriously than I should; perhaps I feel the situation more keenly than I should, but I confess I am actually alarmed because I know it is impossible for me to get the labor to do the work necessary on

my farm. My experience has been that Saturday nights a man comes to me and says, "I can get 25c more a day at such a place." I can't pay him the extra 25c. What is the result? What are you going to do about it? There is a limit to what a farmer can do and you can't compel laborers to come to you and work on a farm if they can get more money elsewhere, and no amount of patriotism or plea of patriotism to these men will compel them to come to you and do farm labor for less money than they can get elsewhere. That is the situation I think the farmers find themselves in at this 48th annual gathering.

SECRETARY AND TREASURER'S REPORT FOR THE VERMONT DAIRYMEN'S ASSOCIATION

For the Year Ending Dec. 1, 1917.

RECEIVED AS FOLLOWS:

Cash on hand Dec. 1, 1916	\$ 353.62
State appropriation	1,000.00
Membership fees	80.00
Space sold in Machinery Hall and for advertisements in report and program	393.00
	<hr/>
	\$1,826.62

/ **EXPENDED AS FOLLOWS:**

F. H. Bickford, salary and expenses for 1916	\$ 209.81
A. H. Peters, P. M. postage stamps	25.00
J. C. Orcutt, Speaker	43.56
Orrin Bent, judging butter	50.00
Geo. A. Hall, use of chairs	6.00
Red Furniture Co., use of tables, chairs, etc.,	9.00
G. H. Lessor, Orchestra	47.00
Hotel Vermont	183.40
Elizabeth Chase, Speaker	10.00
Myra Johnson, Speaker	5.00
Miss G. S. Smith, Reporter	60.08
Miss Helen Holmes, Speaker	30.00
W. B. Bullock, printing	1.85
Bogle Brothers, cups	25.80
W. G. Reynolds Co., chairs, etc.,	10.00
Capital City Press, printing programs ..	125.00
W. H. Harrington, services in butter room and exp.	24.63
Edward Van Alstyne, Speaker	42.88
C. B. Lane, Speaker	53.30
The Red Furniture Co., Balance of bill ..	2.70
P. A. Campbell, Speaker	37.50
F. H. Bickford, Secretary, cash paid, incidentals, etc.,	36.84

The Opinion Press	41.25	
W. B. Bollock, printing	2.84	
The American Jersey Cattle Club, for Speaker	54.95	
A. H. Peters, P. M. postage stamps	31.00	
M. A. Adams, services in butter room and exp.	21.82	
M. A. Adams, services as Treas., 1916-17	20.00	
F. H. Bickford, Secretary, Salary and cash paid out for the year 1917	211.52	
Carried to Premium Fund	175.25	
		<hr/>
Total expenditures	1,597.98	
Cash on hand Dec. 1, 1917.....	228.64	
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		\$1,826.62

Premium Fund for 1917.

RECEIVED:

Orrin Bent, contribution	5.00	
395 lbs. butter sold	158.00	
From general fund to bal.	175.25	
		<hr/>
		338.25

EXPENDED:

For 225½ points butter @ 1.50	338.25	
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Accepted and adopted as read.

PRESIDENT'S ADDRESS.

*Your Honor The Mayor of Burlington,
Members of the Vermont Dairymen's Association,
Friends:*

We convene for our 48th annual convention. During the past year dairy products have risen in price almost by leaps and bounds and so have all those things that go into their production with the possible exception of hay, and even that has gone up in price quite appreciably of late. Concentrates have been so high in price that until recently or the time of the last Commission-made price few dairymen were actually feeding their cows to the limit of profitable production. Home grown grains yielding much better than a year ago are helping out considerably.

The propaganda poured forth upon us last Spring to increase production was a stimulus to do so, but over all was the prospect of high prices and we did our best; but our granaries are not overflowing which is no fault of the producer for seasonable weather went against us, and we must content ourselves with lesser yields than we sometimes get and hope for better things this coming season.

It is one of the phases of the great gamble we are engaged in; for our business seems to be a great gamble from the time we sow until we reap. We have floods and droughts and insect and fungus pests and temperature and soil conditions and a host of other things that go into the making of a successful crop and then we know not what the price will be until the time of harvest; if then sold, possibly the price received will be below the cost of production and the crop should be held for a raise to insure profitable production.

This holding process requires capital that we may pay our bills which follow production mighty close and now we must be on good terms with our bankers for at this time they enter upon the scene if they have not already done so before. A good set of farm accounts is of great assistance at this time. Do not think that it is very difficult to keep a set of farm accounts for our experiment stations have removed a lot of their complexities and the County Agent is always ready to lend assistance.

Some of these obvious things that enter into crop production, and I include dairy products as a crop, we can-

not well control but other things we can, such as buying and selling. I believe there are a lot of very common seeds sold under high sounding names and by smooth tongued salesmen that should be fed instead of sown. Buy of those dealers only that are known to you and then of those varieties that you know do well in your own locality.

In growing corn for our silos, I do not believe the big late maturing dents such as Leaming and Eureka should be grown to form part of our dairy rations. They compel the handling of a great amount of water and contain too little digestible matter. Only two minor things can be said in their favor, they fill our silos from a small amount of land and they are supposed to remove a little more dry matter per acre than the smaller and earlier maturing varieties. I know there is a wide difference in the corn that can be grown for instance in the Champlain Valley and on our hillsides.

I am told the County Agent of Washington County carried out some experiments or demonstrations, quite extensive in scope, and found Sanford to lead all varieties in making the best silage.

Soy beans are working out well and will soon be used extensively in forming part of our silage ration.

The matter of successfully selling our farm and dairy products is one of great concern to both producer and consumer. We are inclined to be so engrossed with production that the most successful marketing is not given sufficient attention.

It often works out that the producer's returns are smaller than they should be and the consumer pays a go-between a high cost for his services. Certainly all those that take part in the distribution of our products must receive compensation and the capital involved must be paid its share as well. At present there seems to be no way to shorten the road between producer and consumer but I do believe that a great deal of service is performed by others in getting our farm and dairy products into marketable condition that we should do ourselves. We should not stop with production, we should proceed and standardize our dairy products and many other of our farm crops right in our own local communities. We should have our plants owned and controlled by ourselves and incorporated in such a manner that outside control is an impossibility. Then we can sell our products to buyers on the basis of some competition between them for the very simple reason that we have our products in marketable condition in such quantity and quality as the trade demands.

You all agree with me that it is a poor business way to produce so many cans of milk and set them out in the yard for some one to come along and pick up and later pay a price largely agreed upon by the buyer only. In this way we lose the power of trading with the buyer, consequently he is given the long end of the evenner. We are living in times of big business and we should be cognizant of this and so shape our business that it will be "big business" to us. This system of collecting I have just spoken of means the outlay of considerable capital to erect and maintain plants or shipping stations and this fact tends to a monopoly for it is uneconomic for others to come in and do likewise in duplication.

With these plants in our own hands we can send just what Vermont milk Boston demands and manufacture the remainder or so-called surplus and then store and hold or do what not with it that we may find best to do.

We have no desire to extract the last dollar the consumer will pay, all we ask is a fair profit on economic production. In times of plenty and low cost production I most certainly believe the consumer should have the benefit of a lower price and thereby increase consumption. Being a participant and having some share in control increases pride and pleasure and a constant strife to produce a better article for the "state of mind" is in the right condition. Where there is a possibility of going ahead along these lines I believe it is well to keep talking about it and create public sentiment in its favor.

It seems to me the present shortage of many of the agricultural products of this Country is the creation of a past neglected agriculture by our Government. The public's attention and the general government's actions have been in the past such as to foster commercial and manufacturing enterprises and let agriculture work out its own salvation as a profitable enterprise. As soon as agriculture is made comparatively profitable the emigration of the young people from the country to the city will cease and they will remain upon the farms to the betterment of both city and country.

We must be in position to educate our children well for it is our duty to fit them as far as we possibly can to successfully fight the battles of life. How deplorable it is to see city bred children when in the country totally ignorant of nature and of animal life. The country boys and girls know these things and we should see to it that in their homes their social training be not forgotten; then when

put to the test they may compare favorably with their urban brethren.

It has always been popular for everyone to shout for two blades of grass where one grew before, except the one that grew the extra blade. The chances are when this is done the price received is less than it would have been had it been a blade and a half when harvested. Of course the railroads get paid on the same basis for hauling big quantities, and so do the commission men; but the farmer takes a lower price because he cannot name his own figure as manufacturers do. Again we are not on the basis of manufacturers in the matter of taxation. They figure in their taxes in getting at the cost of an article, and this means the consumer pays the taxes; and as we are large consumers of all kinds of manufactured goods do you see where we get by without paying those taxes? On our part we pay taxes on our property which is very tangible, and prices are made solely on demand and supply in far away markets.

Just now there seems to be the dawn of a new day appearing in a general awakening of interest in our agriculture. We now have a commission-named price for our products, and I believe this commission is earnestly endeavoring to arrive at some fair basis.

We are short of farm labor and as the season of more work advances conditions indicate no improvement. Our farm boys are responding to the Nation's call and in doing this they are nobly following the examples of their forbears.

COW TEST ASSOCIATION SESSION.**POSSIBILITIES OF COW TESTING ASSOCIATIONS.**

ADDRESS BY O. M. CAMBURN,

VERMONT DAIRYMEN'S ASSOCIATION CONVENTION,

BURLINGTON, JANUARY 16, 1918.

We have for our consideration this morning the "Possibilities of Cow Testing Associations." That there are possibilities in this work is proved by the very rapid growth of these associations and by the results obtained during the last few years. That there is a need for more of them is shown by recalling that of the 22,000,000 dairy cows in this country, 7,000,000 are unprofitable. A poor cow has always been unprofitable. With the present high prices of feed these poor cows cause losses so great that many dairy-men have considered selling their herds.

The first cow testing association was formed in Denmark in 1895, with only thirteen members. At that time the average production was about 112 pounds of butterfat per cow. In thirteen years they raised the fat production to an average of 224 pounds per cow, as compared to 145 pounds for the average cow of the United States. In this country the first association was formed in 1905 in Michigan and at the end of four years' work the average of the 272 cows was 265 pounds of fat, an increase of 50 pounds of fat over the average production of the first year. From this beginning the cow testing associations have grown to 459 associations on July 1, 1917, Alabama being the 38th state to take up the work.

In our own state the work was started in 1908 and has had a steady growth up until the beginning of the world war. The first consideration in this work is the improvement which can be obtained in the individual herd, and secondly, the good to the herds in a community. This herd improvement is brought about by the elimination of the low producing, unprofitable cow, by better and more economical feeding and by the use of pure bred bulls, backed by good yearly fat records.

Records are available which show an 18 cow dairy to have increased the average fat production 60 lbs. per cow, by five continuous years of record keeping. In 1913 this herd had an average production of 3,978 pounds of milk and 162 pounds of butter fat, with an income above feed cost of \$25.01 per cow. At the end of the fifth year the record book showed the average cow to be producing 5,865 pounds of milk, containing 223 pounds of fat and making an income above feed cost of \$39.10, which was an increased income per cow of \$14.09. The average production of 223 pounds of fat which this herd had obtained by five years' work was about the average production of another herd of 20 cows which entered an association in 1915. At the end of the first year, this second herd showed the average cow to be producing 5,870 pounds of milk containing 227 pounds of fat. The feed cost was \$48.40, leaving an income over feed cost of \$65.32. At the close of the third year, (1917) of record keeping, the average cow of this 20 cow herd was producing 7,352 pounds of milk and 300 pounds of butterfat at a feed cost of \$53.29, leaving an income of \$97.09 above feed cost.

The records of these two herds show that by continuous record keeping, with careful studying of those records, the standard of a herd can be advanced.

In one association, 11 herds kept records for three consecutive years, the first year the average cow showed an income over feed cost of \$42.23, the second year the income was \$51.70, and the third year (1917) \$60.25. Four other herds in this same association kept records for only two years. Their second year (1917) the average cow made an income over feed cost of \$48.66. While the income of the average cow of eight herds which were in the association for one year only (1917) was \$46.30. This shows that those herds which had been in cow testing association work for three years contained more efficient cows and were making greater returns than the herds which had not been improved.

The higher quality of the cows in the association herds is also true of all the entire association. In one association the income over feed cost of the average cow in the entire association was \$39.00 in 1915; the second year, the average cow returned \$48.00, and in 1917 the returns per cow was \$59.00. To accomplish this 663 cows were sold out of the association and 657 were brought in. Not all of the cows sold were unprofitable, but each year the yearly fat standard was raised and those cows producing below that standard were sold.

In another association in 1913, the average cow was producing 4,932 pounds of milk and 214 pounds of butterfat at a yearly feed cost of \$31.00, with an income over feed cost of \$36.00. At the end of the fifth year, 1917, the average cow of the association was producing 6,099 pounds of milk, a gain of 1,167 pounds; 244 pounds of fat, a gain of 30 pounds at a cost of \$42.00 per year, or an increase of \$11.00. The income over feed cost was \$51.00 the last year, or an increase of \$15.00 for each cow. This was an increase for an entire association of more than 400 cows. In other words, the members were receiving \$6,000 more their last year than they did the first year. These 400 cows produced 2,439,600 pounds of milk during the year. It would have required 494 cows of the standard of the first year to have produced that same amount of milk.

The better quality of the cows in a certain community due to association records gives an added value to those animals. Not infrequently one will hear of grade cows with association records selling for \$30.00 to \$40.00 more than was offered for those same animals before they had records. In one instance, a dairyman sold seven yearlings for \$750.00 because the dams had yearly association records. There is also the advertising value of association records. Take, for example, that of the two cow testing associations in Ohio which have the average butterfat production up to 308 and 310 pounds per cow. This was the highest average of any association in the United States and it was not long after the information became public until they had sold 95 head of purebreds and grades to many different states. These same opportunities are open to the Vermont associations if they will but keep the records before the buying public.

Cow testing associations also offer the breeder of purebred cattle the opportunity of doing advanced registry work which is of great financial, as well as breeding value.

Records of auction sales in one breed show that in the auction ring 171 tested cows sold for an average price of \$465.00 while 187 untested cows sold for \$288.00, a difference of \$177.00 per head. This same wide spread is also true of offspring, as 133 head from record dams sold at an average price of \$341.00, while 184 head from untested dams brought only \$209.00.

Perhaps the greatest safeguard for the future dairy is a good sire to head the herd. Here again the cow testing association can be of great help by proving out these sires through the production of their daughters.

One dairyman with a herd of 15 cows had an average production of less than 200 pounds of fat, found that his best producer was a grade which had a record of 257 pounds of fat. Her heifer calf by a purebred bull was saved and raised and as a three year old has produced 270.9 pounds of butterfat and the herd average is now better than 240 pounds of fat per cow. Each year he has sold some of the lower producers and replaced them with heifers of his own breeding or with good producing cows purchased, thus bringing the herd production higher each year.

We have all heard about the selling of sires because they had been used two years in one herd, or were not handsome or were getting old. About many of these same sires, we later hear stories like these: 14 daughters average 14,173 pounds of milk and 565 pounds fat, the 14 dams produced an average of 10,957 pounds of milk containing 411 pounds of fat or the daughters averaged an increase of 3,216 pounds of milk and 154 pounds of butter fat.

And again we hear of the bull "gone but not forgotten" whose four daughters average 25,210 pounds of milk and 997.3 pounds of fat. These are terrible losses to the dairy industry, still they are going on each year. Why not use the cow testing association for all you can get out of it? Prove the bulls by the production of the daughters, then keep the bulls.

Whenever the association records prove these bulls to be getters of good producing daughters, retain them in the neighborhood. Form bull clubs as three members of one association have already done. They purchased for \$200 a bull out of a cow producing 700 pounds of fat, two years later they have purchased a second bull of the same line of breeding for \$300 out of a 900 pound butter fat cow. These men have the foundation laid for good future herds at a less cost and with greater prospects of more rapid advancement than any of them could have done as an individual.

The opportunities, therefore, of the cow testing association are unlimited, but the upbuilding of a dairy herd is assured by the elimination of the unprofitable, low producing cows, by better feeding, by the use of the best sires and by the raising of the heifers from the best cows.

ADDRESS.

BY RALPH P. HOTIS, SCIENTIFIC ASSISTANT IN DAIRYING,
UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF ANIMAL INDUSTRY.

"The subject under consideration is "Possibilities of Cow Test Associations." I would like to broaden that into "Of What Use Is The Test Association To Me And How Can Its Usefulness Be Enlarged?" I shall not attempt to enlarge upon the fact that a Test Association has for its fundamental purpose the picking out of the best cows in each herd for we all know that there must be a head and a tail and it is a self-evident fact that the association will show just how high the head is and how low the tail hangs. So we will pass this with but a casual glance.

It has been my observation that the first year is the most enthusiastic for the individual member. He is anxious to know whether "Old Bess" is better than "Old Brown", or if his herd is ahead of neighbor Johnson's. With this in mind he examines his books regularly each month and ponders over the figures. The second year he loses interest and joins simply as a duty to his neighborhood. The third year he joins from course of habit, and looks at his book at erratic intervals. This is a big mistake, for the figures in the book might mean a dollar in the pocketbook instead of a dollar debt at the feedstore.

I realize that for years the words "increase production" have been kept before the farmers until they have come to regard any cow with a 10,000 pound milk record as the best, and that her record deserved but a casual glance. However, her large production does not tell the whole story. Her stable mate is good for only 8,500 pounds of milk, but makes that production at a feed cost of \$65, while the 10,000 pounder requires feed to the value of \$120. In other words the extra 1,500 pounds for the big producer must bring an average of \$3.70 per 100 pounds in order to put her on an equal basis with her stable mate. Consequently it is very easy for the 10,000 pound cow to put the dollar in the feed store, while her stable mate jingles the dollar in your pocket.

Throughout every rural community there is a large number of growing boys, and it has become a real problem to know how to keep these boys on the farm. I would like

to suggest that the members of the test association sit down with the boy and go over their records. How many of you have ever stopped and thought that

“The little fellow, some fine day,
Will have a dairy of his own—
A herd, and barns, and meadows gay
And all the joys that you have known.”

Teach him to know the value of these records and the new interest aroused may be the means of keeping the boy on the farm.

Ever since cow test work has been started the pasture has been figured the same for all members. It mattered not whether a man had but 10 acres for a herd of twenty cows, and resorted to soiling, or if his neighbor had 30 acres for the same number, both would be figured at the same rate. Besides each month has been figured on an equal basis. This makes an error in the feed cost of 100 pounds of milk. Let me illustrate: “Old Brindle” freshens in May, and reaches her maximum capacity in June, when pasture is at its best. This gives her a large production at an extremely low feed cost, and at the end of the year her total feed cost is low. With the present method of figuring one might as well say that you could take 400 pounds of 3% milk and 600 pounds 4% milk and call it 1,000 pounds 3½% milk. One method is as logical as the other.

I feel that Cow Test Associations here in the East have been following along in the same rut year after year, expounding for their main object the fact of being able to tell producers. This is well and good, for producers we must have. Yet I feel the time has come when other things can be used to the advantage of the individual. There comes to my desk each week a copy of Hoard's Dairyman. On some one page of each issue is a summary of several associations, giving the state, tester, number of cows tested, number of cows over a certain production, and owner of high producing cow. As yet I have failed to see such a report from Vermont. Would it not be advisable to put Vermont on the map of “cowdom”? Not only put her there but keep her there from month to month. Show the West that they are not the only ones to have high producing cows, and that you can equal or excel the pace they have set.

Then there is the question of local publicity. One of the best mediums of advertising is through the news items of the daily papers. Let me suggest that each month there

appear in your local paper a condensed report of the work of your association. Embody in this report the three leading herds for the month both as regards production of milk, and production of fat. Have a short account of some of the leading rations fed, their cost, and note from month to month any change in the ration, its effect upon the cow, if any. However, you will need to guard against two things. In the first place, the editor is apt to condense such reports, making the account fit the space, rather than create a space for the account. Secondly, the report is apt to be put in some out-of-way place. In order to remedy this it might be well to have a talk with the editor explaining the nature of the work, and its importance to the farmer.

For the past few years you have heard much about co-operation, and more particularly about co-operative buying. Have you ever thought of the latent possibilities that the test association offers? As a general rule spring and fall are the two seasons that the farmer makes the greatest effort to dispose of surplus cattle, and the local buyer generally does business on a grand scale at these seasons. Now where can we make co-operation and the cow test association join hands? I would suggest that you adopt a standard for production in your association, say 6,000 pounds. Then at some stated time in the spring and fall, let the Secretary of the association get in touch with each member, finding how many cows he has for sale that have attained this record the preceding year, their age, breed and exact record. After this data has been collected, let the Secretary put an advertisement in some good farm paper, somewhat as follows:

Such an Association offers one, two, or possibly three carloads of cattle with guaranteed production for 1917 of over 6,000 pounds, composed of the following breeds.

Friends, you are living on the margin of a vast consuming public. Three hundred miles south of you the farmers are depending to a great extent upon some one else to raise their cattle, but where are they buying? New York and the West. Show them that you have the stuff and you have created a market.

In what way then is the test association of use to me, and how can I make it of greater use? First, by studying my books more closely; secondly, by studying them with my children; thirdly, have records figured on a correct basis; fourthly, use publicity of farm papers and the daily press; fifthly, sell my cattle in a co-operative way, guaranteeing their previous production.

WEDNESDAY AFTERNOON SESSION.

ACCREDITED TUBERCULIN TESTED HERDS.

BY E. S. BRIGHAM, STATE COMMISSIONER OF AGRICULTURE AND LIVE STOCK.

Vermont was one of the first States to recognize the seriousness of bovine tuberculosis as a menace to the public health and to the live stock industry. In July, 1894, twenty-three years ago, a bulletin on the subject of this disease was published by the Vermont Experiment Station, showing the results of applying the then comparatively new tuberculin test to the Station herd and also the results of tests made by the Station veterinarian, Dr. Rich, for the State cattle commission and in private practice. In addition to much other valuable material, this bulletin also contains an interesting compilation of data showing that, at that time, only six States having live stock controlling boards had State laws especially mentioning tuberculosis, and in only nine States were the live stock officials using the tuberculin test. In November, 1894, the Vermont legislature passed an act giving the State Board of Agriculture authority to deal with tuberculosis and also to pay indemnity for animals slaughtered. As an indication of the vigor with which the work of tuberculosis eradication was prosecuted in Vermont, I might cite the fact that in the great live stock State of Wisconsin up to 1908,—the period for which I have available data,—a total of 72,638 animals had been tuberculin tested under the supervision of the Experiment Station and the State Veterinarian, while in Vermont, 210,189 animals, or nearly three times as many, had been tested under the supervision of the live stock commission. In view of this record, showing as it does the progressive stand taken by Vermont in the control of tuberculosis, it would hardly seem necessary for me to take your time in discussing this subject; yet I believe it fitting that we review the work which has been done, the results accomplished and that we discuss plans for the future.

From the report of former live stock commissioners and from the books in our office, I find the following record of work done since the tuberculosis control law was passed

in 1894: A total of 339,463 animals have been tuberculin tested under the authority of the commission, of which 24,667 animals, or 7.2%, have been killed as tubercular, at a net expense to the State of \$763,420.79. This total number of cattle tested is but 2% less than the total number of the milch cows and other neat stock in the State last April, as shown by the compilation of the listers' figures recently furnished me by the Secretary of State. The total number of cattle killed as tubercular is nearly equal to the dairy cow population of either one of our two most important live stock counties, Orleans and Franklin, and is substantially greater than the dairy cow population of any of the other counties of our State.

The results accomplished by this work are hard to inventory. The educational value has been undoubtedly of greatest importance. I recall in the early days much skepticism on the part of breeders. Some did not believe in the test, others did not believe there was such a disease. To-day we hear little of this, and I venture to say that in no State in the Union is public opinion more favorably disposed toward good, sound, conservative methods of tuberculosis control than in Vermont. Many owners have had annual tests of their herds and have observed sanitary requirements, so that we undoubtedly have many herds in the State free from tuberculosis, which may be credited to the methods of control adopted. Although the percentage of reacting animals among the number tested is approximately the same as when we began in 1894, yet there is consolation in the fact that this percentage is about 7, while a great live stock State east of the Mississippi River shows, for three recent years, an average percentage of reactors of 19 2-3. We have, perhaps, done well to check the spread of the disease.

In view of the favorable public sentiment which I have indicated, I believe the time is opportune to consider a program formulated from the view point of a more complete eradication of the disease.

Some thoughtful persons believe that our present policy of appropriating only money enough to test a comparatively few herds here and there over the State is not leading to any definite results. They believe that we should pass a law compelling every cattle owner in the State to have his herd tested within two years and appropriate money enough to test every bovine animal in the State and pay indemnity for those reacting to the test. In this way they believe we might once and for all rid our cattle of tuberculosis. If it were possible to detect every tubercular

animal by a single test, if it were possible to destroy every last bovine tubercular germ by slaughtering these animals and by thorough disinfection, such a plan might, in the long run, be the most economical. But, as a matter of fact, these results are not possible of accomplishment. Eternal vigilance on the part of the owner is the price of a herd free from tuberculosis. Sanitary surroundings must be maintained; all sources of infection must be avoided and repeated tuberculin tests must be made, so that if, by chance, a case does develop, the animal may be removed before others are infected. That a disease free herd may be maintained by such methods there is ample evidence to prove from the records in the live stock commissioner's office; that failure to take every precaution to guard against the introduction of disease often leads to failure may also be proved by the same records.

If this be true, it seems to me that the ultimate unit in the control of tuberculosis must be the individual farm. A farm is a certain portion of the area of the State. If the State enters into co-operation with the owner of a farm to free that farm of tuberculosis and can induce the owner to take the precautions necessary to keep the farm free, then so much of the State's area has been cleaned up, a certain portion of the enemies' territory has been taken and the positions consolidated so that it may be held. Under such a procedure, as farm after farm is taken from possibly infected territory and added to known non-infected territory, we have made progress in cleaning up the State.

The fundamental defect in our present policy as determined by law is, in my opinion, that the State is spending too much money for tuberculosis control for which it requires too little in return. Under the law an owner of live stock may call upon the live stock commissioner for a test and if there is sufficient appropriation available the commissioner must examine the herd and apply the test at the expense of the State and pay indemnity for reacting animals. There is no authority whatever to impose any restrictions upon the owner. He may go out into the market and purchase untested animals to replace reactors taken and paid for by the State, with a fair probability that he will purchase some as bad as those which were condemned. There is no obligation on the part of the owner to ever have another test or to observe any of the precautions found necessary for the maintenance of a disease-free herd. Under this method we can easily conceive how a herd owner might call upon the State repeatedly during a series of years to pay for reacting animals and yet the herd

still not be free from disease. I believe the State should limit its assistance to those persons only who are willing to enter into a bona fide partnership with it to produce and maintain a disease-free herd. I believe also that this partnership between the State and the individual should not terminate at the end of one year or two, but should continue for all time, so that the State may be sure to hold the ground gained. As a matter of fact, we are really paying too much money to-day for live stock insurance and not enough for effective tuberculosis control.

As a more efficient policy in the future, I would suggest the adoption of the accredited herds plan, which has been in use in Minnesota for four years, in Wisconsin for a shorter time, and has recently been adopted by the Federal Bureau of Animal Industry and the National Association of Live Stock Sanitary Officials. This plan contemplates that breeders who follow certain regulations shall have their names placed upon an accredited register in the office of the State Live Stock Commissioner and in the office of the Bureau of Animal Industry at Washington, the idea being that certain privileges will be granted and certain value will be given to a herd by this distinction, so that it will be an inducement to a breeder to produce and maintain a healthy herd.

The regulations adopted by the National Live Stock Sanitary Officials at Chicago in December, defining what shall be classed as accredited herds, are as follows:

"An accredited tuberculin tested, pure-bred herd is one which has been tuberculin tested by the subcutaneous method, or any other test approved by the Bureau of Animal Industry, under the supervision of the Bureau of Animal Industry, or a regularly employed veterinary inspector of the state in which co-operative tuberculosis eradication work is being conducted. Further, it shall be a herd in which no animal affected with tuberculosis has been found upon two annual or three semi-annual tuberculin tests, as above described, and by physical examination.

"The entire herd, or any cattle in the herd shall be tuberculin tested or retested at such time as is considered necessary by the federal and state authorities.

"No cattle shall be presented for the tuberculin test which have been injected with tuberculin within sixty days immediately preceding, or which have at any time reacted to a tuberculin test.

"No herd shall be classed as an accredited herd, in which tuberculosis has been found, by the application of the test as referred to in paragraph one, until such herd has

been successfully subjected to two consecutive tests with tuberculin, applied at intervals of not less than six months, the first interval dating from the time of removal of the tuberculous animal from the herd.

"Prior to each tuberculin test, satisfactory evidence of the identity of the registered animals shall be presented to the inspector. Any grade cattle maintained in the herd, or associated with animals of the herd, shall be identified by a tag, or other marking, satisfactory to the state and federal officials.

"All removals of registered cattle from the herd, either by sale, death or slaughter, shall be reported promptly to the said state or federal officials, giving the identification of the animal, and, if sold, the name and address of the person to whom transferred. If the transfer is made from the accredited herd to another accredited herd, the shipment shall be made only in properly cleaned and disinfected cars. No cattle shall be allowed to associate with the herd which have not passed a tuberculin test approved by the state and federal officials.

"All milk and other dairy products fed to calves, shall be that produced by an accredited herd, or if from outside or unknown sources, it shall be pasteurized by heating to not less than 150 degrees Fahrenheit for not less than twenty minutes.

"All reasonable sanitary measures and other recommendations by the state and federal authorities for the control of tuberculosis shall be complied with.

"Cattle from an accredited herd may be shipped interstate, by certificate obtained from the office of the state live stock sanitary officials of the state in which the herd is located, or from the office of the Bureau of Animal Industry without further tuberculin test, for period of one year, subject to the rules and regulations of the state of destination.

"Strict compliance with the above rules and regulations shall entitle the owners of tuberculosis free herds to a certificate (Tuberculosis Accredited Herd), issued by the Bureau of Animal Industry and the state live stock sanitary authority; said certificate good for one year from date of test, unless revoked at an earlier date.

"Violations of the letter or spirit of these regulations shall be considered sufficient cause for immediate cancellation of co-operation by the state and federal officials."

These regulations are those considered necessary by the Federal Bureau of Animal Industry and the live stock officials of the states for the production and maintenance

of a herd which they are ready to vouch for as free from tuberculosis. They were also unanimously adopted by a committee representing the breeders.

The requirements of a breeder are essentially these: the herd must be subjected to frequent tests, it must have two tests without having reactors, it must be maintained under reasonable sanitary conditions, no cattle shall be allowed to associate with the herd which have not passed an approved tuberculin test, milk fed to calves must be from an accredited herd or must be pasteurized. There is not, I am sure, a single requirement which is not necessary for the breeders' own protection if he desires to keep his herd healthy.

The advantages to a breeder are many.

1ST: He may feel fairly secure in building up his herd on this basis that after many years of careful work he will not find that this insidious disease has all the time been at work to destroy what he has gained. In 89 herds tested from July 1st to January 1st, we have found 11 herds, or 12%, having 50% or more reacting animals. Some of these cases have been pitiful. Men who have spent years in careful breeding have lost all they have gained and must now begin anew.

2ND: Animals in an accredited herd will have an added commercial value. Careful dairymen are becoming more and more particular as to the health of the animals purchased, because they have often found that they cannot rely upon a single tuberculin test at the time of purchase for the reason that apparently healthy animals in infected herds may later develop the disease. Such dairymen will pay higher prices for stock from a herd with a clean history. The Hoard's Dairyman farm is advertising its stock as being for fourteen years eligible for the accredited list. No purchaser need have the least fear of purchasing stock from such a herd.

3RD: Animals may be shipped interstate without further tuberculin test for a period of one year. Vermont is the breeding center from which owners of milk producing herds in States to the south of us replenish their herds. I estimate that this trade has brought into the State over one-half million dollars since July 1st, 1917. All States are now becoming more strict in respect to the importation of cattle from other States. Some States have had such unfortunate experiences in dealing with unscrupulous persons, that they are compelled to adopt more stringent measures to guard against fraud. Since July 1st we have had three cases where cattle were admitted to this state upon

approved tuberculin tests made in the states of origin and yet reacted to a retest and were found badly diseased. Some states are going so far as to require a quarantine of all imported cattle for sixty days and a retest at the end of that period. If state live stock commissioners will admit animals from accredited herds without such restriction, as I feel they will be glad to do, out-of-state buyers will naturally seek out accredited herds in making their purchases. The Commissioner of Connecticut recently told me that some dairymen from his state had gone to Wisconsin for the purpose of buying from accredited herds. I have reason to believe that the Commissioners of Massachusetts and Connecticut will admit Vermont accredited cattle, tested annually, upon certificate from our office. This cannot help adding dollars to the value of our accredited animals. Furthermore, the statistics given as to the number of cattle slaughtered in the countries now at war would lead one to forecast a very large demand for breeding stock after peace is established. We may be sure that these countries will be careful in re-establishing their live stock industries not to buy diseased cattle. If we want our share of this business we must prepare to furnish a clean bill of health for our herds.

Since July 1st we have been co-operating with the Federal Bureau of Animal Industry to the extent that the bureau has detailed a veterinary inspector for tuberculosis testing in Vermont and the state has employed a veterinarian on salary to do work of the same kind. Herds tested by either of these men and found free from tuberculosis will, when they have passed another test, be eligible for the accredited list. When this year's work is over I feel sure that we shall have at least 100 eligible herds. If our present co-operative arrangements with the Federal Bureau continue, I believe our present appropriation and the law under which we are working, will enable us to complete the second testing of these herds, so that they may be accredited and will also enable us to get several more herds in line. This will give us an opportunity to try out the plan to see if it meets the approval of our breeders. If it does meet with their approval and seems to be a practicable method of gaining and holding ground in controlling tuberculosis by forming a lasting bond between the individual farm and the state and federal authorities who have control of this work, I shall ask the co-operation of the breeders at the next session of the legislature to so revamp our live stock laws that our funds may be largely devoted to helping those herd owners who

sincerely desire, not only to produce but also to maintain, healthy herds by following those regulations which will place them upon the accredited list. It will also be well to consider if it will not be good business policy for the state to appropriate enough money so that every herd owner who is willing to agree to follow these regulations may be taken care of. In this way we shall sooner get control of the disease and stop the expense. By paying less than we do now to insure owners, we may assist more of those who sincerely desire to maintain clean herds, without greatly increased expense to the state.

The present status of our appropriation for this fiscal year is such that we are warranted in receiving applications for testing about 1,000 head of cattle more than we now have applications for on file. If there be any here who are interested in the accredited herds plan and who believe in its advantage so that they wish to have their herds eligible for the accredited list, as soon as possible, we shall be glad to receive their applications. Let us not make our neighbors from the nutmeg state go away out to Wisconsin to buy dairy cows from accredited herds. We need the money here.

Wednesday afternoon, at two o'clock, Dr. Charles E. North, Director of The North Public Health Bureau, gave an address on sanitary milk production. This address was illustrated with lantern slides showing in order the following subjects:

The production of milk by the dairy cow in the udder where the udder is supplied with raw materials through the circulation, and where the glands of the udder transformed the liquid nourishment obtained from the blood into milk. The pictures showed the milk channels in the udder and the animal matter which is shed from the walls of the udder and carried out with the milk. The speaker stated that the udder is frequently attacked by sudden inflammations caused by bacteria which cause a thick discharge with the milk, and that dairy farmers should never send to the market milk containing products of inflammation.

The next series of pictures showed bacteria and the different kinds of strainer cloths used on dairy farms. Dr. North showed that even the finest mesh of cheese cloth strainer is so large compared to the size of bacteria that a regiment of 160,000 germs can march through one of the openings in the meshes of such cheese cloth. He argued that consequently it is useless for dairy farmers to try to

strain bacteria out of milk, and that the only way bacteria can be removed is to keep them out in the first place.

Then followed photographs showing the results of Dr. North's work in dairy farms in different parts of America in the production of sanitary milk. First, on a certified farm where even in an old barn milk containing only a few hundred bacteria was produced by the use of simple sanitary care; then at Homer, N. Y., where 71 dairy farmers produced milk of unusual cleanliness for the use of the infant milk stations in New York City. These were followed by photographs of farms and milk shipping stations at Sparks, Md., Oxford, Pa., Rockdale, N. Y., Fair Haven, Vt., and Wilton, N. H.

In all of these places Dr. North was able to establish his system of clean milk production, which consists of paying a premium to dairy farmers for producing milk up to bacterial standards, and reduce the bacteria in milk from millions to a few thousand. In all of these places, Dr. North established bacteriological laboratories in the country for the testing of milk, and the reports of the results of these tests were regularly posted on the bulletin board of the shipping stations, and mailed each week and each month to the individual dairy farmers.

Another series of lantern slides showed the results obtained by changing the milkers or dairymen in a group of ten dairies at Kelton, Pa. Dr. North brought ten dairymen who understood the methods of making clean milk to Kelton where they performed the milking operations one afternoon in the dairies of ten of the Kelton farmers. In this way, in one day the milk of these dairies was transformed from milk containing many millions of bacteria to milk containing less than 10,000 bacteria.

Dr. North then showed the steps which he considers to be fundamental for the production of clean milk. These steps were as follows:

- (1) Brushing cows
- (2) Washing udders
- (3) Washing hands
- (4) Milking in covered milking pails
- (5) Straining through sterilized cheese cloth
- (6) Cooling in ice water
- (7) Washing pails and cans with alkali powder and brushes, and sterilizing with boiling water.
- (8) Boiling strainer cloths on the kitchen stove for at least one-half hour.

Dr. North explained that any dairy farmer can produce Grade A milk by the adoption of these methods.

BY F. L. DAVIS, FORMER LIVE STOCK COMMISSIONER:

The subject has been one of great interest to me for a good many years and especially while I was Live Stock Commissioner. I have been greatly interested in this paper by our present Commissioner and I wish to endorse very heartily his remarks in regard to cleaning up the herds. I found in my experience that the discouraging part of the Live Stock Commissioner's work was that after the State had been to the expense of cleaning up a dairyman's herd and giving him a clean bill of health, then he would start out, regardless of tests, to replace the animals that had been taken out by the tuberculin test. We cannot make any permanent progress until this situation is overcome. I have endeavored to have past legislatures make a bill compelling every man selling, especially thorough-bred animals, to have the tuberculin test applied before delivering to purchasers but the legislature seemed to think that was infringing on a man's personal rights. There is a clause in the present live stock law providing that all tests shall be reported to the Live Stock Commissioner. The work that is being done at present with the assistance of the Federal Government is a very good one. I am glad if such an arrangement can be carried out because Vermont has the reputation of being one of the best dairy states in New England, and that reputation extends far and wide. If this work can be carried on and we get our accredited herds there is going to be more demand for dairy stock from this state than ever before.

In regard to buying cows to take the place of the diseased animals: occasionally we have animals that come into the State that have been tested in the State from which they were shipped and in from 60 to 100 days after arriving here they have been tested and reacted. Then the question arises, what is the use of the test? That does not happen very often but I believe it does happen in cases where the animal is far advanced in the disease and an ordinary dose of tuberculin is not strong enough to create a fever. I try to impress upon our veterinarians they first should make a physical examination and if, in their judgment, there is sufficient show of the disease they should give that animal a double dose, which in most instances will create a fever and the result will be more satisfactory.

WEDNESDAY EVENING SESSION.

Committee on resolutions appointed by the President, consisting of Dr. J. L. Hills, E. C. Hillis, and E. A. Curtis.

THE FUTURE OF THE DAIRY INDUSTRY.

BY DR. CHARLES E. NORTH, DIRECTOR, THE NORTH
PUBLIC HEALTH BUREAU, NEW YORK CITY.

In his address in the evening Dr. North used a large series of charts showing tabulations and diagrams of the results of his work as Chairman of the Committee on Milk appointed by Mayor Mitchel of New York City to investigate the cost of milk production and the cost of milk delivery in New York City. The results of the investigation of this Committee are included in the Report of the Mayor's Committee on Milk, which was published in December, 1917. Dr. North's lecture consisted in extracts from this report, and the charts and diagrams which he used are included in the Report. Copy of this Report can be obtained from the Department of Health, Bureau of Public Health Education, New York City.

The particular points made by Dr. North were as follows:

(1) That the advance in the price of milk during the past two years has not been as great as the advance in the price of other food products. He showed this by tabulations showing the advance in the price of other food products as well as milk.

(2) Statistics of the milk supply of New York City were shown by a chart, which was as follows:

STATISTICS OF THE MILK SUPPLY OF NEW YORK CITY.

The following statistics give figures for the month of October concerning the milk supply of New York City.

These figures were supplied by the officials of the New York City Department of Health:

Dairy Farms	30,934	
Milk shipping stations	800	
Dairy cows	400,000	
Milk received November	1,627,127	qts. daily
New York State supplies	1,402,277	qts. daily
Pennsylvania supplies	114,630	qts. daily
New Jersey supplies	58,100	qts. daily
Vermont supplies	36,120	qts. daily
Connecticut supplies	9,000	qts. daily
Massachusetts supplies	4,000	qts. daily
Canada supplies	3,000	qts. daily
Milk sold in bottles from wagons ...	598,671	qts. daily
Milk sold in bottles from stores	105,647	qts. daily
Milk sold in cans from stores	710,654	qts. daily
Milk sold in cans to manufacturers ..	185,750	qts. daily
Retail dealers	350	
Retail wagons	4,978	
Wholesale wagons	1,522	
Grade A Raw Milk	50,000	qts. daily
Grade A Pasteurized Milk	170,370	qts. daily
Grade B Pasteurized Milk	1,380,360	qts. daily
Grade C Milk	None	

(3) The value of milk as a food. The speaker showed the value of milk as compared with the value of other foods by the following statement:

Prof. M. J. Rosenau, of Harvard University, states that the value of milk is as follows:

A glass of milk is about equal to	2 large eggs,
	a large serving of lean meat,
	2 moderate-sized potatoes,
	5 tablespoonfuls of cooked cereal,
	3 tablespoonfuls of boiled rice, or
	2 slices of bread.

He called attention, however, to the fact that the value of foods no longer depends entirely upon their quantity or chemical composition, but the work of Prof. E. V. McCollum of Johns Hopkins University in the feeding of laboratory

animals shows that to determine the value of food it is necessary to actually feed it. He stated that the experiments of Prof. McCollum showed that there is no substitute for milk, and that if young animals are to grow and that if adults are to keep strong, it is positively necessary that they should use milk and dairy products in addition to other foods.

(4) The quantity of milk which should be used by the people of New York City for drinking purposes, and the quantity of milk which at the present time is actually used by them for drinking purposes was shown by a tabulation and a chart as follows:

How much milk should be used for drinking purposes by New York City? If we use the quantities recommended by Professors Sherman and Lusk, the City would consume the following amounts daily:

Quarts of Milk Which Should be Used a Day			
Age	Population	Each	All
Under 1 year	130,500	1	130,500
1—2 years	126,700	(1½ pt) ¾	95,025
2—6, 6—14 years...	1,387,900	(1 pt) ½	693,950
Over 14 years.....	4,092,392	(1 glass) ¼	1,023,098
Total	5,737,492		1,942,573

Dr. North stated that the quantity of milk consumed in New York City had been reduced more than 25% as a result of the increase in price during the past two years, and that as a part of the investigation by the Mayor's Committee on Milk there were 2,200 families visited by a house to house campaign, and that the results of the investigation of these families were as follows:

"We have eliminated all families in which there were not two children under 6 years of age. This study is based

on 2,200 families. There were 5,438 children under 6 years of age. Between 6 and 16 there were 2,534 children.

- "121 families were getting more milk than in October, 1916.
- "599 families were getting the same amount of milk.
- "1,480 families were getting less milk.
- "219 families have cut their milk supply 25 per cent.
- "969 families were getting 25 to 50 per cent less.
- "169 families were getting from 50 to 75 per cent less.
- "3 families were getting from 75 to 99 per cent less.
- "120 families were getting 100 per cent less.
- "982 families had children less than one year of age.
- "2,148 children under 6 years of age were using tea and coffee as substitutes for milk."

The cost of milk production was determined by reports received from a large number of investigators attached to the dairy colleges and experiment stations. The most prominent of these was Prof. Warren of Cornell University. His statement regarding the cost of producing 100 pounds of milk was as follows:

Professor Warren submitted an exhibit showing the average investigations published by Michigan, Connecticut, and New York State Agricultural Colleges as a result of cost accounts compiled from six separate investigations. From these he derived the formula of cost items in the production of 100 pounds of milk as follows:

Grain	34.7	lbs.
Hay	51.8	lbs.
Silage	105.9	lbs.
Labor	2.9	hrs.

He assumed that the cost of these items was: labor 25c. per hour, grain \$55 per ton, silage \$6 per ton, and hay \$15 per ton. This would make the average cost of 100 pounds of milk \$2.94.

Dr. North stated that the dairy farmer was not to blame for the increase in the price of labor and of feed. These increases were as follows:

Increase in the price of feed:

Feed	Oct., 1916	Nov., 1916	Sept., 1917
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Gluten	\$35.57	\$41.45	\$57.00
Bran	31.07	33.70	38.00
Dry Grains	35.70	40.70	59.00
Brewers' Grains	28.95	33.95	49.00
Cotton Seed Meal	42.95	46.45	55.00
Corn Meal	35.50	40.15	48.50
Hominy Meal	39.20	43.70	62.00
Average Prices	36.50	41.07	57.31

Labor, the witness stated, could be obtained in 1916 at a cost of 20c. per hour. In the year 1917 this cost has increased about 50 per cent and the scarcity of farm labor is a most vital worry.

He also stated that figures submitted for the State of Vermont correspond with those from other states, which showed that the cost of milk as stated by the Dairymen's League was not too high.

The speaker then took up the cost of distribution in the city, and submitted a table showing the cost of distribution taken from the books of a number of the largest milk distributing companies. These are shown in the table below:

For comparison with the results obtained by the Wicks Committee, the Mayor's Committee on Milk secured similar data from five of the large distributing companies for ten months ending November 1, 1917.

The following was the result of this survey :

Cost Items.	Emple State Dairy Co.	Mutual McDer- mott Co.	Clover Farms Co.	Alex. Campbell Milk Co.	Borden's F. P. Co.
Average Selling Price, Quart	.08680	.08322	.08855	.11628	.093144
Amount paid to Producers	.05627	.05198	.05645	.05782	.045685
Country Station Expenses.	.00269	.....	.00911	.00408	.014711
Freight .....	.00563	.....	.00704	.00986	.007984
City Station Expenses.....	.01107	.01438	.....	.00921	.023738
Delivery .....	.00857	.....	.....	.02820	.....
Cartage, Ferriage .....	.....	.01683	.01358	.....	.....
Factory Expense .....	.....	.....	.....	.....	.....
Administration, Clerical and Overhead .....	.00203	.00319	.00430	.00470	.00181
Depreciation .....	.00193	.00109	.....	.....	.....
Total Cost of Distribution .	.03192	.03549	.03483	.03605	.047614
Total Cost .....	.08819	.08747	.09128	.09387	.093299
Profit or Loss	L.00139	L.00425	L.00273	P.00241	L.000155

From the above figures it is obvious that only one company made any profit, while the others sustained losses. The speaker pointed out that about 60% of the supply is sold at wholesale in cans, and only 40% in bottles, and that the selling price must consist of an average of both the wholesale and retail milk.

The next subject discussed was that of surplus milk, in which the speaker showed that the amount of milk consumed by New York City each month does not correspond with the amount of milk produced by dairy farmers. This difference appeared most strikingly in a chart showing the annual and monthly difference between the supply and demand.

The actual annual loss on surplus milk if manufactured into butter at butter prices was shown in the following table:

Products.	No. of lbs.	Butter at .3884 Skim at .75	Butter at .3884 Skim .50	Butter at .3884 Skim .00
Surplus	582,945,000	.....	.....	.....
Butter (82% fat)	25,649,580	\$9,962,286.87	\$9,962,286.87	\$9,962,286.87
Skim	512,991,600	3,847,497.00	2,564,998.00	.....
Butter Milk ..	44,303,820	.....	.....	.....
Total Receipts		\$13,809,783.87	\$12,527,284.87	\$9,962,286.87
If sold as milk at \$2.44 per 100		\$14,223,858.00	\$14,223,858.00	\$14,223,858.00
Loss		\$414,074.13	\$1,696,573.13	\$4,261,571.13
\$Loss per 100 lbs. surplus....		.071	.291	.731
Loss per quart surplus .....		.00153	.00626	.01572
Loss on surplus applied to entire supply, per quart .....		.00042	.00173	.00436

In the above table the price of butter is quoted at .3884, which is the average for the past year; and the price of milk at \$2.44 per hundred pounds. Skim milk is sold at various prices. In the table 75c. per hundred, 50c. per hundred and zero are used. Buttermilk is often not marketed at all, and the price has, therefore, not been included.

One of the most interesting charts showed the decrease in the cost of producing milk as the amount of milk per cow in the herd increases.

In another chart the speaker showed the decrease in the cost of producing milk as the size of the dairy herd increases:

The conclusions reached by the speaker concerning the milk supply were as follows:

CONCLUSIONS.

1. Milk is the most valuable and the cheapest of human foods even at present prices.
2. For drinking purposes New York City now uses only about 700,000 quarts daily. The city should use about 2,000,000 quarts daily for drinking in an ideal diet.
3. The cost of milk production at present prices is 7 cents per quart and the prices asked by the Dairymen's League are justified.
4. The cost of distribution as shown by the dealers' accounts is justified and not large enough to prevent business losses.
5. The cost of production can be reduced by
 - (a) eliminating low-producing cows,
 - (b) collective hauling of milk,
 - (c) collective buying of grain.
6. The cost of distribution can be reduced by abolishing competition and duplication through centralizing the distributing system into a single company or public service corporation.

THURSDAY FORENOON SESSION.**Jan. 17, 1918.****LIVE STOCK AS A WAR FACTOR.**

BY PROF. GEO. F. E. STORY, PROF. ANIMAL HUSBANDRY,
UNIVERSITY OF VERMONT.

That "Food will win the war" is generally accepted as the truth. This being a fact, the important problem which we face is to secure a proper relationship between the various classes of food in our food production campaign.

We have heard during the past year a great deal regarding "war gardens", also the production of beans, potatoes and other cereal crops. Until recently, people have seemed to overlook the relative importance of animal products as compared to cereals. It can be conservatively stated that the portion of the food budget of the average family which goes for the purchase of potatoes, beans, flour, cereals, and the like, amounts to between 23 and 25% of the total food cost, while 65% of the budget is spent for animal products in the form of meat, milk, eggs, and the like. What is more important, milk and some of our other animal products are admittedly the cheapest form of nutriment which we can purchase. Is it not well for us with these facts in mind to develop a rational system of agriculture which will truly meet the war needs of the nation?

There are two reasons why all lines of live stock farming will be more permanent and will continue profitable longer than the production of cereals once the war has ceased. The first is that even though we find very high prices being paid for wheat at the present time, the cessation of the war together with a good crop will absolutely break the grain market of the world owing to the fact that great quantities of grain have been stored, waiting transportation to the markets. Live stock industry cannot suffer an immediate calamity such as may occur with the cereals, owing to the fact that there is a tremendous world shortage of meat and milk animals due to the ravages which war has made in the herds and flocks of Europe. These factors are sufficient insurance to encourage people to continue in some line of live stock endeavor. We should

also try by all means possible, to make our farms self-supporting as at present organization rather than to plunge into the production of cereals concerning which they have had little or no experience.

To meet the increased demand for animal food, we turn first of all to the dairy cow. She is capable of producing more units of human food from an acre of feed than any animal known. In addition to milk as a source of food, we have butter, cheese, condensed milk, milk powder, and various products made from milk, all of which have their special and important uses.

That the numbers of dairy cattle must be maintained is a recognized fact and the various regional milk boards which have been sitting in different localities have so fixed the price which the producer is to receive for his milk that the business is now on a much more attractive footing and should encourage production even in the face of the severe labor shortage which is bound to be felt this coming season.

Many people are turning to the production of beef as a way to relieve the labor difficulty. It would seem well to encourage beef raising on farms removed from the railroads where labor is difficult to secure and retain and where the cost of transporting dairy products is high. Modified beef production under these conditions will probably be as profitable as dairying and certainly will not be attended with so great worry as is now experienced by men with large milking herds. The consistent efforts on the part of several large organizations to encourage beef raising will without question be attended with considerable success.

The fact that there are now 28,000,000 less cattle in the world than three years ago, many of these having come from the breeding herds, is guaranty sufficient as to the prices for the next few years for both beef and dairy cattle.

Swine rank next to the dairy cow in the economical production of meat. In fact, at the present time, pork is one of the most expensive and important articles of the soldier's diet. The meat can be easily transported, partly cured to keep well, and furnishes fats which are of tremendous importance to the man who is undergoing exposure and strain.

As great a military authority as Hindenburg realized the great need of fats and plead with the people of Germany to raise more pork to better nourish the soldiers and ammunition workers.

Our needs are now the same and must be met.

The hog population of the world at large has decreased nearly 32½ million head since the war began. This tre-

mendous shortage has caused the high prices which in turn are bringing the breeding stock to the slaughter houses and will in turn produce still greater shortage of this class of meat. We should all endeavor to increase the number of hogs on our farms not only because it is profitable but because they represent an important factor in the winning of the war.

Another class of stock which is receiving great attention at the present time is sheep. We find that in the world there is a shortage of 54½ million head. This, together with the fact that much of the wool produced in Australia is not available has led to an acute wool shortage which has greatly handicapped our authorities in providing clothing for the army and navy. Wool has raised to a price which has been unknown since the Civil War and mutton has become a luxury. Without attempting to go into a discussion of the methods of adapting sheep to our New England hillsides and the profits which may be expected from these, I will say that many farmers are finding it profitable to add a small flock of ewes to their other live stock population, and in this way increase their total income without further labor expense.

One other class of stock needs attention and that is the farm flock of poultry. Egg raising as a specialized industry has been completely paralyzed by the high prices of the recent year. This does not seriously effect the farm flock and many a dollar has been profitably earned by the keeping of a flock of one or two hundred hens as an adjunct to the main industries of the farm.

Realizing that the live stock industry is and must always remain the backbone of American agriculture, it behooves us at this critical time to make it as efficient as may be by better methods of breeding and feeding and control of disease, together with the marketing of products without waste. Only by doing these things can we as live stock producers perform our service to our country efficiently in this time of need.

THURSDAY AFTERNOON SESSION.

CHEESEMAKING POSSIBILITIES FOR THE CREAMERY.

BY PROF. H. B. ELLENBERGER, DAIRY SCHOOL INSTRUCTOR,
VERMONT AGRICULTURAL COLLEGE.

In these days of stress the conservation and proper utilization of all food products are of vital importance to our nation and to the world. This opens an opportunity for the creameryman to do his bit for his country and at the same time to benefit his patrons and himself financially by conserving and preparing for human food as much as possible of the milk coming to his plant.

Many creameries in the past have been interested only in the butterfat of the milk. They have depended on the producer to use the skim milk and buttermilk or else have sent it down the drain. Thus less than one-half of the food material in the milk has been utilized by the creameries. The balance, a vast amount, has been sometimes wasted or at least not always used to the best advantage. Waste or inefficiency cannot be tolerated to-day and if they could few creameries in this section can practice either and continue to meet competition.

The one-product plant is almost a thing of the past. The successful creamery plant of the future will be larger, stronger, and better equipped than many have been heretofore. It will be equipped not only to make both butter and cheese, but in many cases to ship milk and cream and often to condense or make milk powder. In order to survive the unsettled conditions of to-day all creameries must pay more attention to the manufacture of by-products. But creameries of Vermont as a class don't need to throw up their hands in despair as some are inclined to do, because of the wide difference between market milk and butter prices. Something like 50% of all the milk produced in the country goes into butter. Besides, Boston cannot drink all the milk produced up here and at present prices you may depend on it that she will not buy more than she can use so there will still be a surplus for the creameries. Much of this difference in price can be eliminated by preparing creamery by-products for human food.

As a sideline or for the utilization of skim milk and buttermilk the manufacture of cheese offers many opportunities. Records show that during the summer months of high milk production, cheddar cheese factories have often been able to pay higher prices for milk than either creameries or milk stations. Many milk buyers have bought milk during these months at market milk prices and made it into cheddar cheese at a good profit. Creameries which have been equipped to make cheese during these periods have had an advantage over those which could not. This then is a cheese-making possibility for the creamery. By being prepared to make cheese during any period when cheesemaking pays better than buttermaking both the creamery and the patrons and also the food supply of the country may benefit. Cheesemaking cannot to-day enable the creameries to pay market milk prices but it may help considerably.

You will note my subject is "cheesemaking possibilities for creamerymen" and it is the "possibilities" such as the one just noted which I want to point out. Cheesemaking is not a panacea for all the ills of the creamery business and I do not present it as such. If it were everybody would jump into it and it would not remain so for long.

Another possibility, when the creamery is once equipped, is the manufacture of part skim cheddar cheese along with buttermaking. One-half or three-fourths of the fat may be removed from the milk as cream for buttermaking and the balance made up into cheese. In the past this combination has often paid better than either butter or cheese alone. If a creamery must buy whole milk and has no special outlet for the skim milk, part skim cheddar cheese may always be depended on to give fair returns. It is worthy of mention that when milk is made into cheese or cheese and butter and the whey fed to hogs at least an equal amount of energy and more than six times as much protein are conserved for human food as when only butter is made and the skim milk fed.

All creameries which decide to try cheesemaking do not have to make the same kind of cheese. There are nearly 250 different varieties known so there is room for choice. But to-day it is well to consider the advantages of making cottage cheese. There is a shortage of meat and the government is urging its conservation. A pound of cottage cheese equals in food value a pound of meat, more than equals it as a source of protein, and 100 pounds of skim milk will produce 14-18 pounds of cottage cheese as against only 4½-5 pounds of pork. In addition when cot-

tage cheese is made the whey which remains will produce one-third as much pork as the skimmilk. So from the standpoint of human food production skimmilk made into cottage cheese with the whey saved and fed to stock is worth at least three times as much as if it were only used as stock feed.

The U. S. Department of Agriculture is urging the use of cottage cheese as a meat substitute and the demand for it is increasing every day. The creameryman who supplies this demand is doing his bit to win the war just as much as are other producers of food. I said the demand is growing. Nearly every groceryman is asked by his customers to supply cottage cheese but many cannot secure it. They are willing to pay 10c. or more per pound to the creamery which will furnish them a steady supply. We have been making cottage cheese from milk used for instruction in our dairy classes at the University but we cannot begin to supply the local demand. Dealers in large cities are using more and more. At present they pay from 5-7½ cents per pound net to the creamery.

You may say that people will not stop using meat and substitute cottage cheese, that they will tire of it. They are not expected to stop using meat altogether but to substitute cheese for only a small portion of their normal meat ration. Supposing there are five persons to a family and each family in the country should use only one pound of cottage cheese per week, only a few mouthfuls per person, it would require over one billion pounds per year equal to the skimmilk produced by 1,500,000 cows. This could equal in protein the carcasses of 2,125,000 1,000 pound steers. Quite a saving of meat.

Cottage cheese is very easily made. It does not require a skilled cheesemaker. Any creameryman can succeed after a few trials. There are two methods of making. One produces a rather granular curd similar to "Dutch" cheese or "schmiercase". It is known on the market as Pot cheese. The other gives a smooth fine grained cheese on the order of neufchatel and is known as Bakers' cheese. The first is the simpler method and will likely prove most satisfactory for local trade. The skimmilk direct from the separator is run into a vat and enough buttermilk or starter added to bring about a firm coagulation in the desired time. This curd is then cut and heat applied until the temperature reaches 95°-100° F. Gentle stirring at frequent intervals is required during this heating. After holding at this temperature for from 15-30 minutes, the time depending on rate of heating and temperature reached, the whey is re-

moved and the curd drained on a cloth spread over a curd sink or drain rack.

The other method requires the use of rennet extract or other coagulating agent. Many city dealers prefer the smooth bodied curd produced by this method. The skim-milk is cooled to 69°-75° F. according to the room temperature and low percentage of starter added followed by the addition of about $\frac{1}{2}$ ounce of rennet extract per 1,000 pounds of milk. The vat is then covered till the next morning when the curd is dipped into cloth bags. These are tied and left in a drainer till most of the free whey has escaped. They are then iced and left to drain until evening or the following morning when the cheese is salted and is ready for use or for shipment.

Once started to making cottage cheese it is only a step for some plants to start making neufchatel and cream cheese but as a rule it is best to leave the manufacture of these cheeses to plants specially equipped and making a specialty of this class of cheese. However, particularly for local trade, it may be well worth while to vary the cottage cheese by offering some of it with pimentos or olives added.

Another possibility is the manufacture of buttermilk cheese. When the cream is not pasteurized a very good grade of cheese may be made from the buttermilk by simply heating it to a temperature high enough to precipitate the curd and holding until the curd is cooked enough so that it will not run thru a cheese cloth or voile strainer cloth. The buttermilk may be heated by an ejector or in a vat, the usual temperature required being from 130°-150° F. An average yield is about 12 pounds of cheese. It sells at the same or slightly lower prices than cottage.

Last but not least is the possibility of making some of the varieties of European cheese which before the war were extensively imported. Many of these are being made successfully in this country now, several creameries in this State already having commenced their manufacture with gratifying results. Some of these Italian and Greek types of cheese, are made from whole milk, some from part skim-milk and others from the whey. There are several firms which are contracting to buy the milk from the creameries sending their own labor to make the cheese. They pay very good prices for skimmilk and butter fat. Other plants make the cheese themselves. There seems to be considerable demand and a good market for all of these cheeses such as Romano, Riccotta, and sveral others.

I have pointed out a number of lines of cheesemaking

which creameries may enter. They are worthy of consideration and careful investigation for any one of them will increase the sum total of human food produced, and they may increase the income of both creamery and patron thus in some cases deciding the issue between life and death for the creamery. The present abnormal demand and relative prices of dairy products will not always continue. There is a readjustment coming, just how soon we do not know, but when it comes the creamery will be needed as a channel for marketing milk. The community which looks well ahead will not allow its creamery or cheese factory to be closed now at least not unless arrangements can be made to keep it in repair and running order as an insurance against the lack of an independent market.

Perhaps you have heard of the storekeeper who sold Johnnie some ginger but I think it illustrates my point. It was some years ago when money was not so plentiful as it is to-day and many families made their store purchases by exchanging eggs, butter and other produce. Johnnie's mother was making a favorite recipe when she came to the ginger can which was empty. She called Johnnie and went to the egg basket but it too was empty so they visited the henhouse but there was not an egg to be found. However, old Speckle was on the nest. The mother explained the situation to Johnnie who burst into the store with "Mr. Brown, Ma wants an egg's worth of ginger and she says to tell you the hen's on the nest."

The storekeeper made a sale but he took a chance and to-day the community in the outskirts of the market milk belt which allows its creamery to close for the sake of selling market milk for a little while at the present premium is taking a much greater chance.

Where cheesemaking may possibly aid in the fight which some of the creameries are having for existence it is worthy of trial.

FOOD PRODUCTION IN NORTHERN NEW ENGLAND IN 1918.

BY J. L. HILLS, DEAN, COLLEGE OF AGRICULTURE,
UNIVERSITY OF VERMONT.

Let us consider: 1. What to produce; 2. Incentives to production; 3. Obstacles to production; 4. How to induce producers to do their utmost. Under the first of these heads I hope in tabloid fashion to convey a little information; under the other heads I am less certain that what I have to say will be directly helpful.

1. WHAT TO PRODUCE.

The foods naturally produced for human use include dairy products, the various meats and poultry products, cereals, beans, potatoes, truck and fruit; those produced for the making of animal products include more particularly the various hays, corn silage and fodder, soy beans, and roots. A few words touching some of the high points.

In making milk one should not fail to choose a variety of corn likely to mature in a normal season, to secure thoroughly satisfactory and viable seed corn, and, if practicable, to grow soy beans in the same row with the corn in order to make the silage better fitted for milk making and lessen grain charges. (See in this connection Vermont Experiment Station bulletins, 190 "Concerning the Corn Crop"; 204 "Concerning Soy Beans"; 205 "Concerning the Germination of Seed Corn"; all free for the asking.)

The principal commandment in connection with hay making is early cutting; the second is to use to the utmost legumes, especially red or alsike clover. If one has had experience and success with alfalfa, let him in this year of stress grow it to the limit; if he has not yet grown it, it is doubtful whether in a year when every ounce of production counts, time should be spent in experimenting with a crop with which one does not always achieve success. (See in this connection Vermont Experiment Station bulletins 170 "Concerning the Hay Crop"; 204 "Concerning Alfalfa"; both free for the asking.)

In view of the high grain prices now obtaining, its scarcity, human food needs, and transportation troubles, it will be well so far as practicable to use home grown grain rations; at any rate to grow more on the farm than heretofore.

Pork is vitally necessary in feeding our Army and our Allies. Let us, therefore, far more than hitherto, make use of rape pastures, of clover pastures, and the like.

Poultry husbandry should be encouraged. Let us form "hen testing associations." There is no Babcock test for hens, but one can tell fairly well by intelligent visual inspection under the direction of the Extension Service Specialist, or of the County Farm Agent, whether a hen is or is not a successful layer.

In connection with the growth of the three vital human food crops, oats, beans and potatoes, stress should be laid upon the clean crop. A little forethought, a little work, a little formalin, means little or no smut in oats, a largely increased crop, more food, more dollars. (In this connection see Vermont Experiment Station bulletin 198 "Concerning the Oat Crop"; free for the asking.) So far as beans are concerned, it is said that he who does not know beans knows but little; yet how few of us know how easy it is to grow a clean bean crop if one has clean seed. There are many thousand bushels of clean bean seed available in Vermont this year; and many more that are less clean. The Vermont Extension Service had a bean specialist in the field all last summer who has seen to it that a fair supply of clean bean seed is available. Bean growers should get in touch with the Extension Service and find out where this seed can be obtained. So far as potatoes are concerned, clean soil, clean seed and a sprayed crop are well worth while. Potatoes cannot be exported. If grown in large quantities, they free just so much more food to send across the water. A potato plant which is killed by blight in August cannot grow good sized tubers. A man who dies at thirty may have lived a useful life but has not accomplished as much as he who lives until he is seventy. A plant which dies when its tubers weigh but two ounces apiece is a "slacker" as compared with the plant which lives to full maturity and grows tubers averaging five ounces or more. But the question is who is the "slacker", the plant which succumbs to disease or its owner who does not prevent the disease. (In this connection, see Vermont Experiment Station bulletin, 113 on "Spraying", free for the asking.)

2. INCENTIVES TO PRODUCTION.

There is more reason to-day for farmers to push production than ever before. We have:

a. *Unequaled market.* New England imports three-quarters to four-fifths of her food supplies.

b. *A world-wide hunger.* New England's food problem is part of the world's food problem and the world is nearer to starvation to-day than ever before.

c. *The Patriotic Call.* "Food will win the war," says Hoover; but he also says that "Food may lose the war." Congressman Dale's clarion call "For God's sake, wake up", uttered to the Nation because of its need of soldiers, sailors, ships, munitions, should be heeded by our farmers as well as by others.

d. *Census Returns.* This country grew 12 per cent more cereals in 1917 than in 1916, the excess being mostly corn, almost all of which was soft. We grew but 2 per cent more wheat than in 1916 owing to winter wheat failures. Our potato and bean crops were increased by 50 per cent, but early frosts and severe winter weather conditions have severely cut these supplies. Our hay crop was decidedly short of that of 1916. We can grow bumper crops in 1918 without serious danger of overproduction. Then, too, in this connection it should be remembered that we are now sending across the water much of the wheat which normally we would eat before the new crops harvested. There seems likelihood of serious wheat shortage in April and May.

e. *High and to some extent stabilized prices for farm products.* The wheat price-fixing commission of last summer and the Boston, New York and Chicago milk price-fixing commissions have done excellent work in making more certain than heretofore that the farmer will be assured of a living wage. The consumer, of course, pays a price which as compared with former days is a staggering one, but the producer's wage should be such as to act as a stimulus to production, and that in this hour of great need is a most important matter, a highly stimulated production. Surely under such circumstances farmers ought to do their utmost.

3. OBSTACLES TO PRODUCTION.

a. *Labor.* Labor is the crux of the whole situation. Farm labor is hard to get; its long and uncertain hours are not attractive as compared with the definite shorter hours of city labor. Then, too, our industries, whether related to war or not, have been tremendously speeded up within the past three years and are taking heavy tolls of our farm labor. Immigration is almost nil now days. Canada has absorbed the floating, able-bodied farm labor by the tens of thousands. Large numbers of our red blooded boys have enlisted. About 1½ per cent of our agricultural population the whole country over was taken in the first draft. In the vicinity of cities, of ship yards, cantonments, munition

plants, etc., the farmers are hard put to it. However, it is certain that war cannot be waged without upheavals and without every class having to make sacrifices. It is of little avail to complain even though the problem is difficult and often impossible of solution. It is well worth while constructively to study the situation.

There are those who believe that every man engaged in farm operations should be exempted in order that "food (may) win the war." It is a grave question whether any such class exemption is wise. It is doubtful whether farmers feel that as a class they ought to seek exemption. Furthermore, there is a great deal of unconscious class feeling in this matter. There are those who think that they are too good to go to war, that their job is too important. Who shall say that the farmer is more necessary than the ship builder, than the munition manufacturer, than the coal miner, than the railway operator, in whose behalf also wholesale exemption is urged? The present classification places skilled farm laborers in class 2, assistant farm managers in class 3, and the farm managers in class 4. This seems to deal fairly with farming as an industry and to protect farmers against the sneers of the future.

Several experiments with labor were tried last year. Many boys, girls, men and women were organized into temporary camps or colonies for farm labor, in some localities by the hundreds; some of these were successful, others less so. Multitudes of high school and college students were released early from classes and brought back into the classroom relatively late in the fall, and they were a considerable factor in increased production. The Salvation Army and kindred bodies were effective in getting semi-dependents onto the farm. Unfortunately, their laudable efforts were often of doubtful value because of the unsatisfactory services rendered by many of the men whom they sought to help. In a number of instances, stores, mills, factories, etc., let their employees off for whole days or parts of days to work for farmers, a scheme which worked well as a rule when tried but was not often tried in New England. Retired farmers, men living on their incomes, etc., did more or less and went "back to the farm", but not to the extent they should have done. And, finally, there was a considerable amount of transfer of labor from one section of the country to the other, especially with negroes, a system which in general worked ill both to the section from whence and to which the labor was supplied.

There seems some reason to hope that the situation will be somewhat better in 1918 than it was in 1917. In

the first place, the farmers have had time to readjust themselves; then too, as has already been remarked, the selective classification of farm labor enables them to know where they are "at"; furthermore the Federal Departments of Agriculture and Labor have struck hands with state agencies and in co-operation are attempting several things. They are making surveys of farm labor conditions by taking account of stock. Farmers wishing to secure farm labor should get in touch with Mr. F. H. Bickford, Care of County Agent, St. Albans, Vermont. He is striving to promote the old-fashioned scheme of "changing works" whereby farmers help each other in their own communities. He is doing what he can in the matter of shifting labor from point to point within a narrow radius, equalizing the labor stress, a scheme which worked out admirably in Nebraska in 1917. He is doing what he can to increase the labor supply of calling upon sources of labor which heretofore have not been freely or systematically employed, such as high school and college boys. He is doing what he can to increase supplies of farm machinery and has secured some degree of priority of shipment of farm machinery and materials used in the manufacture of machinery. He is assisting to some extent in the movement now well under way, whereby the places of men in certain agricultural operations may be taken by women. And, finally, he is doing a good deal in looking up the matter of non-essential industries with a view in time of raising the question whether they may not be drawn upon as a source of farm labor. In this connection may the writer say that he went through a recent Burlington directory and found that perhaps one in twelve of the industries listed therein might under present conditions properly be called non-essential; for example, bootblacks, florists, men music teachers, and piano tuners, taxidermists, keepers of art stores, not to speak of saloon keepers.

In this connection should be mentioned the movement in Congress now taking shape, looking toward the release for farm work of enlisted and drafted men located in the cantonments during the harvest season, and, likewise, the movement which is beginning to crystalize which aims, forcibly if necessary, to set able-bodied men not actively at work at doing full work. This is perhaps best illustrated in the Maryland law recently passed, the validity of which is now being tested in the courts, a law of the most drastic character which permits the State to put its hand on any man's shoulder, be he "rich man, poor man, beggar man, thief" and force him to go to work for the public good pro-

vided he is physically able to do so. How such a law will work out in practice is problematical.

The writer well understands that New England farmers have been hit as hard or harder in the matter of labor conditions than any in the country, yet he believes they should set their teeth and set themselves at work to do their best. He believes that as a class in 1917 they responded to the utmost, that many of them played a losing game, that many sold at less than the cost of production, that many must retrench in 1918 or face the possibility of bankruptcy. He knows that many worked more hours per day in 1917 than ever before and that, because of untoward weather conditions, their labors often were spent more or less in vain. He knows that some became embittered by the experience, that some have felt resentful, have sulked, have felt like slowing up, like slacking, like lowering production, like selling off their cows, like reducing expenses, like playing safe, like saying in effect "Each man for himself and the Kaiser take the hindermost." With such men he raises the question whether this is the year when self-interest should rule or when enlightened self-interest, that paramount. He would recall to such men the fact that at Verdun the motto was not "Safety First" but "They shall not pass". He would urge the farmers who seek guaranties before they plant to remember the boys in khaki in France who have gone there without guaranty. He would ask them to remember that serious shortage in food supplies is very likely to lose the war and that their responsibilities in such an event would be weighty. He would ask each man, each woman, to remember Hermann Hagedorn's beautiful verses:

"There are strange ways of serving God,
You sweep a room or turn a sod,
And suddenly to your surprise,
You hear the whirr of seraphim
And find you're under God's own eyes
And building palaces for Him.

There are strange, unexpected ways
Of going soldiering these days.
It may be only census blanks
You're asked to conquer, with a pen,
But suddenly you're in the ranks,
And fighting for the rights of men!"

b. *High Prices.* Everything is relative. He who complains touching the high cost of grain, of labor, of all farm supplies, should hark back to the days of the early nineties when milk sold at sixty cents a hundred. Surely times are better now than then. In those days abandoned farms were the rule; to-day no farmer is too poor to own a Ford.

c. *Fertilizer.* The supply is short, the demand likely to be great, the freight situation acute, the charges high. Should the farmer use commercial fertilizer this year freely or not? Should he not consider it as an insurance policy? Should he not use it in lieu of farm labor? These are local questions. He should, however, carefully study his individual problem, determine what he needs, order promptly and wherever practicable, combine with others in the purchase of carload lots, carefully weighing the questions: Will it be worth what it costs; what shall I choose; how shall I get the most for a dollar?

d. *Seed Corn.* This situation is so serious that too much stress cannot be laid upon the necessity of prompt action. County agents should be able to help in varietal choices.

e. *The Slacker Cow.* We always have her with us. In King Solomon's time we were warned to "Be diligent to know the state of (our) flocks and look well to (our) herds". Solomon knew what he was talking about. However, the owner should look well to himself as well as to his cow and query whether his cow has had a chance, whether the fault is inherent in the cow or due to his own faulty methods of feeding and care. In other words, again referring to the Bible, he will remember the state as to "the mote and the beam."

f. *Too many farmers lack knowledge as to their business.* Too few know what it costs to make a quart of milk or a crop of corn. If they use the simple account books now being distributed through the County Agents by the Extension Service, they may, with very little effort, determine their labor incomes and find out whether or not they are actually succeeding. The farm management demonstration specialist of the Extension Service has held the mirror up to many a farmer and has enabled him to see where he was making money and where he was losing it. Too many farmers are like the Italian fruit seller who complained that "What I maka on de peanut I losa on de dam banan'." Too many farmers grow too many "dam banans" on which they lose money; and they never know it.

g. *Farm machinery*, particularly the tractor, must come in increasingly to take the place of labor. It well may be under the circumstances that some of these large pieces of machinery may be owned in partnership between neighbors or in communities.

4. INDUCING PRODUCERS INCLINED NOT TO BE LAGGARDS TO INCREASED PRODUCTION.

Under this head the writer would rehearse the arguments on the preceding pages concerning unequalled markets, world-wide hunger, our allies' food needs, the census of our 1917 crops and the high and relatively stabilized prices for farm products. He would point out that President Wilson in his message at the opening of the Congress, indicated the need of immediate legislation which would serve to appease the complaint of farmers who "with a good deal of justice feel that while regulation of food prices restricted their income, no restraints were placed upon the prices of the things which they themselves purchased." He stated that "Congress must go further in authorizing the Government to set a limit to prices" for the reason that "the law of supply and demand has been replaced by the law of unrestrained selfishness."

He would also point out, what Hoover intimates, the possibility that food may lose the war. Mr. Hoover, whose opportunity for seeing the entire horizon is unequalled says that Germany, after three years of blockade, supports a population three-fifths as large as our own, on an area less than that of Texas, for the reason that every man, woman and child is mobilized for the utmost production and the closest conservation. Germans with set teeth are said to be making and wearing paper clothing while many American men and women are peeved because they cannot get all the sugar they want to eat. He points out that there is a steady degeneration of the world's food supply due to the increased diversion of our production units and the vital need of tightening legal and administrative measures over our food production. He avers that the Russian revolution is primarily due to the fact that she failed to mobilize her food production resources and that had these been properly guided she would now have a stable and free government. Mr. Hoover's point of view appears to be that food producers must be stimulated to produce even at the expense of the consumer and this point of view, I take it, is mirrored in the wheat prices established by Congress, whereby the farmers now receive 42 per cent of the price, a new

arrangement where so far as seems to be humanly possible, extortionate profits of this species have been eliminated.

Then again, the speaker would point out to such men the situation evidenced by President Creelman of the Ontario Agricultural College, the War Minister of Agriculture of the Province of Ontario, who states that notwithstanding the draft upon Canadian resources, notwithstanding the tremendous draft upon her farm labor, many times greater than that thus far made or likely to be made in this country, Canadian farmers with determined faces have set themselves successfully to their tasks and last year raised greater crops than ever before in the history of the Dominion. What Canadian farmers have done American farmers can do!

The speaker would urge farmers who feel discouraged to get in touch with the County Agent and the Farm Management Demonstrator, to increase the value of their animal machines, that is to say their cows, hens, etc. He urges them to "buck up", to "do their all." He does not suggest that they go to work in any ill-advised haphazard fashion, but to set themselves to do their well-considered utmost, placing production "uber alles."

To such as do set themselves to do their utmost in this year of world crisis two returns seem reasonably certain; in the first place a living better by far than it was a generation ago, with all that word implies, and in the second place, a sense of service to humanity. Let us remember what Hagedorn said, that "There are strange ways of serving God, Strange unexpected ways of going soldiering, " that "You sweep a room or turn a sod, and find you're in the ranks and fighting for the rights of men." I repeat I would not have any farmer strive to do more than it is reasonably certain he can do effectively; but I would have him not fail to do that. I would have him take to heart the lesson of the wonderful cartoon of the Kaiser and King Albert of Belgium, published shortly after the rape of that unhappy country, wherein the Kaiser is represented as saying, contemptuously, "And so you see you have lost everything", to which Albert proudly replies, "Not my soul."

REPORT OF COMMITTEE ON RESOLUTIONS.

The Vermont Dairymen's Association in convention assembled, is thankful to speakers, exhibitors and to all who have contributed to the success of this meeting.

It wishes to put on record its appreciation of eight years of faithful and effective service of its Secretary. It sometimes happens that an organization kicks a man upstairs and makes him its President in order to get rid of him. Every member of this Association knows that this is not the case with Mr. Bickford and we rejoice that we are to profit by further active service in his new position.

Oleomargarine, like the poor, we have always with us; but in view of present prices of dairy products and the worldwide shortage therein, there may be more room for this butter substitute than formerly. Butter pound for pound has greater food value than have its substitutes. We always believed it and now we know it. Careful scientific studies have proved beyond the possibility of cavil that this is so. Dairy products contain vitamins, vital life principles, intimately related to the virility of our race. And oleomargarine, and the several substitutes of vegetable origin, do not. Not that the latter are not safe to eat, nutritious and healthful but that they lack this important ingredient. This is an entirely legitimate argument in behalf of the butter interests.

We have no quarrel with oleomargarine as such, when sold as such, in its natural hue; but we have and always will protest against its being permitted to wear our colors, thus enabling it to masquerade as butter. The fact that an attempt is likely to be made to remove the Federal tax on colored oleomargarine and that there is greater probability than heretofore that this attempt may succeed, leads us to urge our Congressional delegation to see to it that our butter interests are protected and to instruct the incoming Secretary to so advise our Senators and Representatives.

We heartily approve H. R. 6188 introduced into the Congress by Representative Sloan, which contemplates the appropriation of a million dollars (millions mean but little nowadays) wherewith the Federal Bureau of Animal Industry may co-operate with the several States in the control and eradication of tuberculosis among our livestock and food animals. We urge our Congressional delegation

actively to support this important measure and instruct the incoming Secretary to forward copies of this resolution to the entire Vermont delegation.

Our wives are paying eighty cents for wool with which to knit sweaters for the soldiers. We have forgotten how lamb chops taste. Under such circumstances, why should we continue to say "Love me, love my dog." We love not the dog the less, but the sheep the more. We believe that Ex-Governor Mead's inaugural fulmination against the worthless cur, voiced eight years ago, was timely then and timely now. It is a pity that session after session in our legislature, where farmers have constituted the majority, the dog seems to have had more friends than the sheep. We hope that the 1919 committee on resolutions of this organization as well as its legislative committee will echo these 1918 sentiments and will petition the next General Assembly and back the petition by active work to the end that sheep husbandry in Vermont may be encouraged by the enactment of an adequate dog law.

For the first time in its honorable history of nearly half a century, this Association meets while the Nation is at war, when swords and spears have been fashioned from shares and sickles. We make dairy products and we pledge ourselves to do all we can to make maximum yields. We have no sympathy in this time of world-wide hunger, with the vicious doctrine held by some farmers' organizations which would restrict production in the interests of higher prices. We believe that the world will be the more likely to be made "safe for democracy" if self is forgotten and the needs of humanity at large remembered, and if D'Artagnan's motto is adopted: "Whether on battlefield or in cornfield, whether shouldering the gun or the hoe, individually and collectively, we pledge ourselves to do our utmost in our country's cause."

Among those whose names appear in our 1917 list of life members who have passed from temporality to eternity within the year, we note in particular that of Gardner Smith Fassett of Enosburg. He was one of our oldest members. In the days of his youth and, indeed, throughout his long life, he was active in our service and a regular attendant at our meetings. In his maturity long before the evil days came, throughout the length and breadth of the state, as a member of the State Board of Agriculture, he set forth the merits of dairying in plain, everyday farmer language. Before the Babcock test was thought of, painstakingly he tested his cows by individual churning and separated the drones from the herd. He was probably the

first dairyman in Vermont to attempt any such separation. In 1891 he was elected by the General Assembly a trustee of the University of Vermont and State Agricultural College and continued in that connection for nearly a quarter of a century, until the years drew nigh when he had less pleasure in them. He exercised supervision over the erection of Morrill Hall and to his careful oversight the University and through it the agricultural interests of the State are indebted. And when, in the fullness of years, with a record of helpful, upright citizenship to his credit, the silver cord was loosed and the golden bowl, the pitcher and the wheel were broken, he went to his long home sustained by unfaltering trust in Him whom he had long and faithfully served. May we in our generation profit by and emulate such examples.

J. L. HILLS.

E. C. HILLIS.

E. A. CURTIS.

Committee on Resolutions.

Report accepted and adopted.

1

BUSINESS MEETING.

ELECTION OF OFFICERS.

President,	F. H. Bickford,	Bradford.
Vice-President,	S. L. Harris,	Proctor.
“ “	C. C. Gates,	North Hartland.
Secretary,	O. L. Martin,	Plainfield.
Treasurer,	M. A. Adams,	Derby.
Auditor,	F. L. Davis,	Hartford.

Two members of the Association will be appointed by the Executive Committee to work in co-operation with the University of Vermont and State Agricultural College along agricultural and dairy lines.

Adjournment.

At the annual meeting of the Guernsey Cattle Club, Vermont Branch, Thursday morning, President E. C. Tenney was in the chair. Reports of the secretary and treasurer were received and they showed that 20 per cent in membership and finances had been gained during 1917. A committee, consisting of H. N. Dow of Middlebury, Col. H. Edward Dyer of Rutland, and Col. H. T. Johnson of Bradford, was appointed to nominate officers, who will be elected at a meeting to be held at the New Sherwood Hotel in this city on Thursday, February 11, at 2:00 p. m. It was unanimously voted to continue printing the sales sheets of the Guernsey cattle owned by the members of the club and to advertise cattle of that brand for sale under the club in State papers. Ariel Mitchelson, a buyer of grade Guernsey cattle from Tariffville, Conn., was the guest of the club and he has contracted for one carload of grade Guernseys to be shipped immediately. E. A. Bishop, su-

perintendent of advance registry work of the American Guernsey Cattle Club, was also a club guest.

At the annual business meeting and election of the Vermont Jersey Association held at Hotel Vermont, the available funds in the treasury were voted to be expended toward advertising the breed throughout the State. President George Nichols of Enosburg Falls presided. Reports of the officers were read and accepted. Officers elected for 1918 were President, Harrison Smith of Chelsea; Vice-President, H. M. Lee of Windsor; Secretary, Guy Tiffany of East Berkshire; Treasurer, Ralph Denio of Bristol. The directors elected were Messrs. Bliss, Fassett, Bickford, and Davis.

At a business meeting of the Ayrshire Breeders' Association of Vermont held at Hotel Vermont at 4:30 o'clock preliminary arrangements were made to offer to the Eastern States Exposition at Springfield next year and to the Vermont State Fair at White River Junction a State exhibit of the Ayrshire breed, the pick of the breed from the State, instead of single exhibits. The committee, to further this plan, appointed was President C. M. Winslow, Secretary Clyde N. Smith and Extension Fieldman J. G. Watson, all of the State headquarters at Brandon.

BANQUET.

As a finale to the 48th Annual Convention, the members of the Vermont Dairymen's Association and their ladies partook of the 19th annual banquet at Hotel Vermont. Lessor's orchestra delighted the diners in the rendition of many appropriate numbers during the evening.

The menu, the covers of which bore a flag in colors and a red cross on the reverse side, included a soup made of Vermont-raised soy beans, which was delicious. Vermont chicken was also included in the menu. About 300 persons attended the banquet and left the dining-room after one o'clock in the morning, inspired with the conviction that this country was in a real war, a conviction they had thrust upon them through burning words of eloquence from the lips of men who brought a war message to them fraught with import.

Congressman Frank L. Greene officiated as Toastmaster and was pleasantly introduced by the new President, Fred H. Bickford. Mr. Greene was at his best and he abounded in stories, sallies of wit, reminiscences and eloquent passages. The Toastmaster read a letter from Governor Graham expressing regrets at his inability to be present and asking the co-operation of each Vermonter in carrying out the new fuel order.

The speakers were Congressman Porter H. Dale, who told of his war visit to France; Hon. Joseph H. Sowerby, representing the Hoover Food Administration; and Dr. John M. Thomas, President of Middlebury College.

In opening, Congressman Greene said in part, "This war will be won. Our problem is not the war alone but after the war. We must lay our all on the altar of sacrifice but we must not lay our individuality. Individualism must be retained in the maelstrom of nationalism that is sweeping over the country and which threatens to engulf the cool head, the single purpose and clear vision of the New Englander. We must 'keep our weather-eye skinned'," said the Toastmaster, "lest after the war is over we are engulfed in this maelstrom. We cannot begin where we left off after the war is over. There are things which threaten the fundamental principles of the country, state and community. We must give all towards the war but

we must not forget our state and community interests and must work harder than ever to develop better nation, state and community interests. Anchor yourself to old Plymouth Rock. It was the foundation and may be yet the only safe harbor of this country."

In introducing Congressman Dale, the Toastmaster voiced a bit of personality in the words "to know him is to love him; to work with him is to appreciate him."

In brief, Congressman Dale said, "We are living in a period of great transformation and we know the world will never again be what it was or like what it was before the war. I never sensed what it meant until I had crossed the sea and saw those fields, saw the men and women and children on the land in which this transformation is taking place, that little land of France. Our nation is obligated to the men in the ranks for their courage, their sturdiness, and their manliness. All I can do personally I shall for the men in the ranks. In France where I was not a man whimpered, not a man had one word of complaint. They are not suffering for anything. My work is now to hammer for guns; guns of large caliber; guns of large size save lives, and those are what we must have. Germany's plan is to bleed France white, to do the same to England, and then crush the United States. The United States has got to win this war, cost what it will. We had to get in, no matter when, and now it's up to us.

"General Pershing is one of the greatest soldiers in the world. He says little, his face is steeled, his eyes are steeled, and his heart is steeled, but behind the cold, steel exterior is a heart of great human sympathy. His speech at the grave of Lafayette, whereon he placed a wreath, the American boys behind him, 'Lafayette, here we are' is comparable with Abraham Lincoln's Gettysburg speech."

Joseph H. Sowerby spoke on "Democracy Mobilized Against Autocracy." He mentioned five points in the campaign of the food administration that every individual must act upon and he dilated on certain important facts concerning same.

1. To eliminate hoarding.
2. To stop waste in distribution.
3. To stop profiteering.
4. To provide for the allies.
5. To have sufficient for our own needs.

Mr. Hoover has said, "Go back to the simple life. Be content with simple food, simple pleasures, simple clothes;

work hard, pray hard, play hard ; work, eat, recreate, sleep ; do it all courageously ; we have a victory to win."

The last speaker, Dr. Thomas, was introduced as a "human parson," so styled by the Vermont soldier boys in camp. He gave a splendid message of hope, relieved by a solemn warning. He said, "The war is certain to result in great changes. Changes came to the country after the Civil War, affecting the manner of the thought of the nation ; the political and spiritual changes wrought were great and marvelous. The changes following the present war will be the same. We never again will be caught unprepared. In Germany before the war I saw plans for the war, but my eyes were blinded. Let us have universal military training. Let us be prepared for all events to come. Let not our eyes be blinded. Our democracy has to be extended to include our social activities after the war and a new combination of endeavors will be developed out of the war for humanity. The time is coming when men shall more evenly come together on a level."

THE WOMAN'S AUXILIARY.

About one hundred women attended the meeting of the Woman's Auxiliary to the Vermont State Dairymen's Association, at the roof garden of the Hotel Vermont Wednesday afternoon. Mrs. Luella Bickford, the president, welcomed the ladies and Mrs. Julian Dimock addressed them on the subject of "Food Conservation." Mrs. Dimock said in part:

"I am not going to be a bit optimistic in this address, I am going to be pessimistic throughout. I don't believe we women of Vermont are working hard enough. We think too much of what we want to do and not enough of what we ought to do. The whole secret of German success is that from the cradle they have been taught to obey. The trouble, I believe, with the women of Vermont is provincialism. That is the trouble with New England. It is the trouble with America. The idea started with Washington's first speech and it was carried on in the Monroe Doctrine. We tend to shut ourselves up too much. We are shut in geographically and we stand by that idea. President Wilson's message last year was the first step against provincialism. We are just beginning to make up to the world idea. We people of Vermont have given but we haven't given enough. The men of Vermont haven't given enough of boys, of money or of conservation.

There is one word which the world has not learned to spell. That is production, and it is to the women that the world must look for production. The men are going to war and the women must do it. That sounds hard to some women who have worked so hard to make the farm pay, but there are plenty of women who have not worked. There are plenty of rested, strong women who could do the work easily. What is the amount the women of America can do compared to what the women are doing over there? When our men come home how are we going to measure up with the standard of womanhood they have got from associating with the women of Belgium, France and England?

"One of the chief troubles with the women of Vermont is that they don't read enough. They don't know what is going on. You can't get the world idea if you don't know what the world is doing. I am saying these things to you

women who are awake because it is the duty of the women who are awake to wake up the others. First we must learn to sacrifice. We must get a broader idea of life. What are our lives anyway? What is the life of your boy or your husband compared to what he is fighting for? What does it matter how long we live as long as during our lives we do our duty?

"And now from that to sugar. Think of the people who think they can't live without sugar! We must not only learn to do without sugar but we must teach our families to do the same. We must see that every member of the family is in step. When they get in step they will stay there. It is up to the mothers to set the pace. There never was a time when human life was worth so much. The mothers must keep up the health and spirit of the men at home as well as those in France. They must do with less sugar, less wheat flour, and less fat but they must find things just as nourishing to give as substitutes. They must keep their families well. When you have keyed yourself up to the spirit of sacrifice, you will be surprised to find that it isn't sacrifice at all, and that you really like the dark bread better than the white. In France they are conserving everything. We can do at least as much as they for we have the Yankee ingenuity to help us along.

"Many of the women of Vermont do not yet realize the importance of saving fat. We ought to do it first because Uncle Sam has asked us to, and second because fat is needed for munitions and for the nourishment of other peoples.

"You town women must also do your share. You must not ask us to supply you with things needed in Europe. The women on the farms must realize that often a tremendous glory comes from doing dull things, if the ideals are right. Perhaps the woman on the farm has not time to do Red Cross work or the other things which are so necessary but if she is only cleaning up the cans and cream separator in the dairy, she is saving human life by helping to give to others cleaner milk and cream.

"Sometimes in conserving we find the substitutes more expensive. What does that matter? Corn is more expensive than wheat but corn can't be shipped and in Europe they don't know how to use corn-meal the way we do. Our part is to buy the corn and let them have the wheat. We must remember that we are fighting to keep alive that for which our fathers gave their lives. War is a great leveller of class distinctions. Already women who are doing war work feel the difference. The men who have

gone abroad are beginning to feel the brotherhood of man and we at home must have that same feeling."

Miss Bertha Lee of Lyndonville next addressed the meeting on "What Women Have Done in Agriculture." Miss Lee said in part:

"Ever since there have been fields to cultivate, women have helped to cultivate them and woman's work has always been to help save the waste. Women have drifted into indoor work as the world grew older but of late years they have taken a new interest in outdoor work and the result is a stronger woman, physically, and a woman who has demanded an education. Since the war broke out women have gone rapidly in agriculture." Miss Lee told of the work at Vassar and how when twelve of the twenty men who ran the farm there went to war, as many girls took their places and did work equal to that of the men in every respect. At the end of season each one of those girls was stronger and healthier in every way.

"At Mt. Holyoke the same experiment was tried and with success. We have come to that point," said Miss Lee, "when we must get busy and use the soil at our door. We must now learn to feed ourselves. That is merely a question of knowing food values." Miss Lee then told the ladies how she started and built up a prosperous farm on four acres of rundown farm land. She told very entertainingly how she overcame her fear of her cow and her experiences with chickens, her garden, etc. She said that she knew from her actual experience that a woman could make a farm pay.

She said, "It is no longer a question of what we can afford. If we want to be good citizens we must form in line and co-operate. We must remember that somebody must raise everything we have. If you have a small patch of land you can sometimes keep a few chickens or have a small garden or a pig. No one must sniff at the idea of owning a pig for given a chance a pig will be as clean as a dog. Women can also raise honey and a good supply of honey will save a year's supply of sugar for someone. We must remember that every spadeful of earth turned, every animal kept is lessening human suffering. Our country calls us all to consecrated duty. Never has so great a nation been called to so great a responsibility. In 1913 we had days of ease and luxury, but those were days of peace. Now we cannot take life lightly. It is sanctified by the death of too many brave soldiers. We must do more, think more, and do more than ever before, and also

we must raise the physical, mental, and moral standard of American womanhood."

Miss Charlotte Pierpont, head food demonstrator in Vermont, gave the last address of the afternoon, outlining the work of the home demonstrators. She said the object of the home demonstrators was to put into the rural communities and the cities, workers to help the people. Four subjects are considered—food, fuel, clothing and income. "If we cannot have adequate heat," said Miss Pierpont, "the question of proper clothing becomes more vital." The program of home demonstration is a broad one. In a great many States this work is already on a permanent basis. The community work takes up as one subject, recreation. Boys' and girls' clubs are formed so it will be easier to work with them for if we are going to have better communities we must first have better boys and girls.

"Some of the communities are already organized. People can help the workers by suggesting what is needed in every community. If any woman has a little pet economy she can help by passing that along. If she has some particularly good substitute bread for wheat bread she can help by telling others about it. Give the workers your co-operation and your hearty support. There is no end to the work that home demonstration can do and we must do the greatest good for the greatest number of people for the greatest length of time. We are all helping to make history. This is war work now but it is work that will extend into the future. After the war is over, we can put into practice what we have learned by the war, for patriotism that is worth while now will go way beyond into peace."

ELECTION OF OFFICERS.

After the public meeting officers of the auxiliary were elected. Mrs. F. H. Bickford was re-elected president, Mrs. H. K. Brooks of St. Albans was elected vice-president and Mrs. H. M. Farnham of Montpelier was made secretary and treasurer.

ANNUAL MEMBERS.

P. K. Kingsley	Rutland, Vt.
F. H. Shumway	101 Tremont St., Boston, Mass.
E. E. Shepardson	152 Lowell St., Somerville, Mass.
E. L. Gardner	165 Broadway, New York.
W. J. Gardner	268 State St., Boston, Mass.
H. H. Wheeler	So. Burlington, Vt.
W. E. Smith	44 Newcastle Rd. Brighton, Mass.
M. C. Saunders	61 Chatham St., Boston, Mass.
Albert Catlin	St. Albans, Vt. R. F. D. No. 1.
Dr. Campbell	Montpelier, Vt.
E. C. Tenney	Dummerston, Vt.
F. B. Howe	Burlington, Vt.
W. C. Connor	Lyndonville, Vt.
W. C. Fuller	Richmond, Vt.
M. J. Wright	St. Albans, Vt.
H. M. Lee	Windsor, Vt.
T. J. Orne	St. Albans, Vt.
W. J. Erwin	St. Albans, Vt.
L. W. English	Woodstock, Vt.
N. H. Jewett	Williamstown, Vt.
F. A. Rift	Wilmington, Vt.
M. C. Eastman	Lyndonville, Vt.
E. A. Darling,	East Burke, Vt.
J. B. Lucia Jr.	New Haven Mills, Vt.
L. A. King	East Corinth, Vt.
Eugene Beaudette	Addison, Vt.
W. A. Vancour	E. Hardwick, Vt.
E. A. Dodge	So. Hero, Vt.
Ira H. Belknap & Son	Cavendish, Vt.
Mrs. Russell Tyson	Brattleboro, Vt.
Edward Lang	Lawrence, Mass.
H. L. Ruggles	St. Johnsbury, Vt.
H. M. Allen	Burlington, Vt.
C. G. Newton	Burlington, Vt.
S. W. Stockwell	So. Weymouth, Mass.
Harry C. Saytor	12 So. Market St., Boston, Mass.
Ellsworth Sisson	Providence, R. I.

LIFE MEMBERS OF THE VERMONT DAIRYMEN'S ASSOCIATION, 1918.

A

Armo, R. A.....Williston
Alden, B. H.....Orleans
Adams, G. H.....South Barre
Adams, M. A.....Derby
Allen, Charles.....East Berkshire
Allen, H. A.....West Milton
Allen, Henry.....Pawlet
Adams, William H.,
369 Marlboro St., Keene, N. H.
Aseltine, M. L....Springfield, Mass.
Aldrich, E. O.,
R. F. D. No. 2, Clarendon
Allen, G. A.,
R. F. D. No. 2, West Brattleboro
Allen, F. E.,
R. F. D., South Royalton
Ansboro, J. E.....Derby

B

Baker, O. W.....Concord
Bruce, M. K.....Passumpsic
Badger, C. A.....Williamstown
Burnett, R. E.....North Pomfret
Burbank, J. A.....North Pomfret
Burr, L. R.....North Clarendon
Brownell, C. W.....Burlington
Brigham, William O...Bakersfield
Burt, William.....Essex
Burt, Frank.....Enosburg Falls
Blair, N. B.....Morrisville
Bliss, Abner.....Georgia
Beecher, H. A.....Hinesburg
Bates, A. E.....Huntington
Barnum, Ell,
R. F. D. No. 1, Plainfield
Brown, J. S.....Plymouth
Bishop, D. B.....North Williston
Byington, C. M.....Charlotte
Bigelow, A. P.....Middlesex
Burke, J. E.....Burlington
Burnham, W. F.....So. Royalton
Barry, R. A.,
173 Chambers St., New York City
Bliss, D. S.....Middlebury
Beach, H. F....R. F. D., Vergennes
Brooks, H. K.....St. Albans

Brigham, E. S.....St. Albans
Bristol, R. H... ..Vergennes
Briggs, E. L.....North Pomfret
Burnett, E. A.,
University, Lincoln, Neb.
Bond, John.....East Montpelier
Blood, W. O.....Norwood, N. Y.
Bass, E. L.....Randolph
Bruce, H. C.....Milford, N. H.
Barry, LeonidasSpringfield
Brothers, H. F.....Hinesburg
Brackett, W. R.,
9 Chatham St., Boston, Mass.
Bean, G. C.....Coventry
Belden, H. W.....Waitsfield
Bickford, F. H.....Bradford
Buxton, J. E...Middletown Springs
Brock, L. F.....Barnet
Barber, E. L.....North Williston
Bushnell, H. N.....Waitsfield
Burrell, D. H.....Little Falls, N. Y.
Bigelow, A. P.....St. Johnsbury
Brewer, J. R.....Hingham, Mass.
Burgham, W. H.....Montpelier
Beach, W. V.....Charlotte
Bent, Orrin,
33 S. Market St., Boston, Mass.
Boutwell, W. C.....Princeton, Me.
Bristol, E. S.....Vergennes
Bellows, F. A.....No. Ferrisburg
Boyden, C. F.....Randolph Center

C

Curtis, H. B.....St. Albans
Conn. Agricultural College,
Storrs, Conn.
Clifford, A. P.....North Pomfret
Cushman, G. L.,
75 S. Market St., Boston, Mass.
Carpenter, E. P...West Waterford
Chaffee, J. H.....West Enosburg
Congdon, Edwin.....Clarendon
Cahee, L. J.....Brandon
Cook, Nelson P.....Mt. Holly
Currier, P. W.....Montpelier
Clarke, M. S.....Clarendon
Clarke, F. H.....Williston
Corliss, N. L.....Swanton

Carter, W. E. Pittsford
 Carrigan, J. D. Pittsford
 Cady, W. N. Middlebury
 Creed, C. A. Pittsford
 Campbell, H. W. Bethany, Neb.
 Chapman, J. H. West Rutland
 Chaffee, Geo. H. Rutland
 Cooke, Geo. S. E. Hardwick
 Crampton, M. S. Rutland
 Chapin, Wm. Middlesex
 Cowdon, H. St. Johnsbury
 Colvin, J. C. West Rutland
 Cunningham, W. F. St. Albans
 Colburn, R. M. Springfield
 Crampton, Charles A. St. Albans
 Cobb, C. H.,

R. F. D. No. 2, Fairfax
 Crane, George. Brookfield
 Chase, C. P. Proctorsville
 Chandler, G. C. Montpelier
 Chase, Perry. East Fairfield
 Carpenter, O. G. Cambridge
 Candon, J. B. Pittsford
 Cloverdale Creamery,

North Underhill
 Chamberlin, H. D.,
 McIndoes Falls

Campbell, Archie,
 R. F. D., South Ryegate
 Curtis, A. C. St. Albans
 Carter, A. C. Rutland
 Clark, Homer F. Charlotte

D

Daley, O. W. White River Jct.
 Donahue, W. C. Monkton
 Draper, F. W. Enosburg Falls
 Dana, E. J. North Pomfret
 Donahue, J. F. Vergennes
 Doe, G. A. Newbury
 Dutton, F. B. Woodstock
 Davis, G. A. Rutland
 Donahue, W. F. Ferrisburg
 Donahue, T. E. Hinesburg
 Dodge, Harrison. Morrisville
 Donahue, D. G. East Charlotte
 Davis, George F. Cavendish
 Darling, E. L. East Burke
 Davis, G. N. Castleton
 Downer, Charles. Sharon
 Davis, C. H. E. Healdville
 Davis, F. L. Hartford
 Dagon, M. R. Madison, Wis.
 Dremar, R. E.,

State College, Ames, Iowa
 Dodge, L. B.,
 300 No. Main St., Barre
 Davis, Geo. H. Hubbardton

Dunsmore, Geo. H.,
 R. F. D., St. Albans
 Dunklee, A. A. So. Vernon

E

Eldred, H. S. Sheldon
 Ellis, I. L. Middlebury
 Edson, E. A. Chester
 Eddy, C. F. Stowe
 Ellis, Edward A. Castleton

F

Federal Trade Commission,
 Washington, D. C.
 Farm Stock Success

Chenango, N. Y.
 Foster, F. O. Lansing, Mich.
 Flint, J. S.,
 155 Loomis St., Burlington
 Flint, J. P. Montpelier
 Fisher, L. C. Cabot
 Farrington, C. W. West Danville
 Fletcher, William. Essex Junction
 Fassett, G. S. Enosburg
 Fisher, D. W.,

Marbridge Bldg., New York, N. Y.
 Ferson, B. W. Goshen, N. Y.
 Fassett, B. F. Enosburg Falls
 Fassett, W. G. Enosburg
 Fuller, C. C. Jonesville
 Fowler, F. E. South Royalton
 Fletcher, Ex-Gov. A. M., Cavendish
 Fraser, W. J. Urbana, Ill.
 Fillmore Farms. Bennington
 Fuller, B. J. Williston
 The Free Library,
 17th & Spring Garden St.,

Philadelphia
 Farnham, H. M. Montpelier

G

Gale P. R. Stowe
 Gates, Gov. C. W. Franklin
 Gibbie, Geo. Groton
 Grout, L. D. Morrisville
 Grout, J. Ex-Gov. Derby
 Gloyd, Jesse. Richmond
 Gilman, A. A. Randolph Center
 Goodspeed, Nelson. St. Albans
 Gallup, J. A. West Woodstock
 Giddings, F. L. Orwell
 Greene, G. F. So. Pomfret
 Gates & Son, Charles

North Hartland
 Gale, J. E. Guilford
 Goss, W. G.,

R. F. D. No. 4, St. Johnsbury

H

Howie, A. F. Mrs.,
Elm Grove, Wis.
Hewitt, J. D.....North Pomfret
Hill, W. N.....Starksboro
Hathaway, F. M....St. Albans Bay
Hooper, V. A.....Blockton, Ark.
Hastings, S. J.....Passumpsic
Harvey, Cloud.....Barnet
Hills, J. L. Prof.....Burlington
Hayward, G. M.....Middlebury
Heller & Merz Co.,
505 Hudson St., New York City
Hotchkiss, C. A.....Georgia
Heffon, Franklin..Highgate Center
Hutchinson, William....Norwich
Hill, H. C.....Isle La Motte
Hillis, E. C.....North Montpelier
Howard, Ernest S., West Hartford
Hall, L. C.....Westford
Herick, A. A.,
R. F. D. No. 2, Milton
Hall, Charles.....Montpelier
Head, George G.....Montgomery
Harwood, J. W.....Orwell
Hewitt, Stephen....North Pomfret
Hoadley, A. E....South Woodstock
Howe, W. H.,
R. F. D., South Royalton
Hayes, J. R.....Stafford
Hitchcock, Ernest.....Pittsford
Higley, Nathan.....Richmond
Hodges, R. W....Springfield, Mass.
Harwood, Burr,
R. F. D. 1, Salem, N. Y.
Harris, S. L.....Proctor
Huntley, George M.,
R. F. D., Fairfax
Hopkins, Hermann, Jr.,
Sheldon Jct.
Harrington, W. H....North Pomfret
Hyde, Wheeler & Co.,
41 N. Market St., Boston
Hastings, C. A.,
17 Union St., Springfield
Hayward, F. R.....West Fairlee
Heath, W. E.....Sharon
Hood, H. P. & Sons.....Woodstock
Hood, C. H.,
494 Rutherford Ave.,
Boston, Mass.
Howe, E. L., R. F. D., So. Ryegate
Hazard, G. M.....Charlotte
Hewitt, Mary.....No. Pomfret
Howard, E. S.....W. Hartford

J

Iowa State Library,
Des Moines, Iowa
Isham, Ed.....St. George
Irish, V. H.....Enosburg Falls

J

Jones, E. H.....Waitsfield
Jackson, L. A.....Hartford
Jackson, J. J.....Fair Haven
Judd, Morton.....Windsor
Jaynes, R. F.,
65 Central Ave., Lynn, Mass.
Jewett, A. & Son.....Middlebury
Jones, G. M.....Waitsfield
Jenne, A. M....R. F. D., Richford
Johnson, C. C.....Pomfret
Jennings, B. C.....E. Hardwick

K

Kelley, G. A.....Underhill
Kingsley, C. J....West Salisbury
Kingsley H. E.....Montgomery
Kinnerson, J. R.....Peacham
Kidder, N. D.....Hastings, Neb.
King, M. D.....Woodstock
Kneeland, D. A.....Waitsfield

L

Leonard, Geo.....Brandon,
Lyster, H. L.....Wells River
Lilly, J. O.....Plainfield
Lyster, T. H.....St. Johnsbury
Lawrence, Henry.....St. George
Lawless, C. C.,
North Haverhill, N. H.
LePage, Charles.....Barre
Loveland, J. H.....Norwich
Leary, J. A.....Jericho
Leonard, W. B.....Orleans
Lewis, M. J.....Woodstock
Lewis, A. L.....Rochester
Lilley, C. M.....Marshfield
Leonard, C. H.....No. Pomfret

M

McCuen, R. W.....Vergennes
Maynard, A. S.....Bakersfield
Marvin, Thomas.....Montpelier
Mosely, F. W.....Clinton, Iowa
Messer, F. A.....Greensboro
Moore, A. A.....Richford
Maxham, G. R.....Woodstock

Merrill, H. J.,
R. F. D., No. 2, Burlington
Milligan, F. B. Walden
McMahon, C. L. Stowe
McLam, J. F. So. Ryegate
Macomber, F. H. Shelburne
McNall, J. M. Milton
McGaffey, E. E.,

Board of Trade Bldg.,

Boston, Mas^s.

Martin, C. D. East Corinth
Melvin, A. D., Chief of Bureau

Animal Industry,

Washington, D. C.

Mass. Agricultural College,

Amherst, Mass.

McDonough, P. M. Hinesburg
McCauley, D. F. Shoreham
Martin, O. L. Plainfield
McLam, G. E. Topsham
Moody, Mark L. Waterbury
Metcalf, R. H. Stowe

N

Nelson, David,
34 Allen Ave., Springfield, Mass.
Newton, C. H. Fargo, North Da.
Nay, Y. G. Jericho
Northrup, P. B. B. Sheldon
Newell, Bigelow. Stowe
Nute, Byron. Lakeville, Mass.
Newton, W. D.,

R. F. D., St. Albans

N. H. Agricultural College,

Durham, N. H.

N. Y. State Library, Albany, N. Y.
Noyes, E. H. Sharon
Noyes, M. C. Sharon

P

Plummer, E. G. Groton
Public Library. St. Louis, Mo.
Porter, W. C. Sharon
Page, L. B. Randolph Center
Parker, E. J. Grand Isle
Parker, J. B. Whiting
Palne, C. S. Bethel
Piper, Arthur. Vergennes
Perry, E. B. & Son. Ira
Page, C. S., Ex-Gov. Hyde Park
Powers, William. Brandon
Perry, S. E. South Pomfret
Pierce, J. H. Franklin
Phillips & Son. E. Candia, N. H.
Pierce, C. C. East Clarendon
Place, R. H. Essex Junction
Perkins, W. E. Pomfret

Palmer, George. New Haven
Palmer, C. E. New Haven

R

Richardson, A. E. Burlington
Rie, Eli. West Charleston
Russell, F. L. Shrewsbury
Richmond, H. J. Deerfield, Mass.
Roberts, D. W. West Hartford
Reynolds, M. W. Middlesex
Robbins, Henry. Middlebury
Roberts, L. J. Waterbury
Ruggles, E. H. Westford
Rice, H. W. Brookside
Rutherford, W. L.,

Waddington, N. Y.

Ricker, N. H. Ryegate
Russell, F. L. Cuttingsville
Ridlon, M. R.,

R. F. D., Cuttingsville

Robbins, H. E. Derby
Ryan, D. E. Orwell
Roberts, G. V. Milton
Roundy, Charles C.,
136 Paine St., Worcester, Mass.

S

Smith W. E. Brighton, Mass.
State Dairy Bureaus,
State House, Boston
Shackford, Mrs. C. J. Nelson,
Ryegate
Stone, W. P. Strafford
Sawyer, A. G. Groton
Spear, V. I. Randolph
Strong, P. W. North Pomfret
Slocum, A. R. South Burlington
Stanhope, Spencer,

Berkshire Center

Stevens, S. H. Enosburg Falls
Snell, T. T. North Enosburg
Stiles, G. M. Morrisville
Standard Package Co.,

Board Trade Building,

Boston, Mass.

Small, Fred M. Morrisville
Stevens, N. C. West Glover
Sanderson, W. L. Milton
Sowles, A. P. St. Albans
Smead, C. D. West Brookfield
Seely, H. M. Middlebury
Smith, C. F. Morrisville
Spaulding, L. C. Poultney
State Library. Concord, N. H.
Sherburne, A. E. North Pomfret
Smith, N. E. Richford

Smith, F. V.....Stowe
 Smith, George G.....St. Albans
 Simpson, W. G.....So. Ryegate
 Smith, F. L.....Fletcher
 Sowles, E. A.....St. Albans
 Smith, E. C., Ex-Gov.....St. Albans
 Sprague, N. T. Jr.,

Brooklyn, N. Y.

Strihues, J. J.....Randolph
 Snow, Mrs. Edward,

Swansey, N. H.

Sprague, George K.,
 East Brookfield

Swan, P. B.....Montgomery
 Scarff, C. W., Col...Seattle, Wash.

Sellow, Robt, P.,
 7 Merchants Row, Boston, Mass.

Sudendorf, E.,
 412 E. Monroe St.,

Springfield, Ill.

Stone, M. S.....Montpeller
 Stone, E. A.....Williamstown

Seaver, W. H.....Taftsville
 Somers, C. L.....South Peacham

Smith, E. E.....West Rutland
 Sykes, A.....Hinesburg

Sisson, Ellsworth,
 P. O. Box 1176,

Providence, R. I.

T

The Jewish Farmer,
 17 Second Ave.,

New York, N. Y.

Towne, E. B.....Milton
 Turnbull, J. G.....Orleans

Tarbox, C.....Jericho
 Towle, E. R.....Enosburg Falls

Teachout, S. D.....Essex Junction
 Tarbell, E. S.....Montgomery

Terrill, G. H.....Morrisville
 Tottingham, L. H.....Shoreham

Talcott, D. L.....Williston
 Talcott, L. F.....Williston

Talcott, J. R.,
 1760 High St., Oakland, Cal.

Talcott, Frank.....Williston
 Tarwell, F.....Hampton, N. Y.

Terrill, A. N.....Morrisville
 Temple, G. H.....Randolph Center

Towle, W. W.....Enosburg Falls
 Trescott, A. J.....West Rutland

Tracey, J. E.....Burlington
 Tear, Frank..R. F. D., W. Rutland

U

Union Association Press,
 47 Ann St., New York

V

Vall, H. W.....Randolph

Van Patten, W. J.....Burlington

Varney, W. M.....Vergennes

W

Washburne, R. M., University Farm
 St. Paul, Minn.

Willard, E. G.....No. Hartland

Warren, L. H.....North Pomfret

Willey Bros.....Cambridge

Ware, O. T.....Brattleboro

Whitcher, J. R.,

R. F. D. No. 3, Groton

Williams, W. H.....Rutland

Wright, Will W.....Brandon

Wheeler, N. B.,

Bakers Mills, N. Y.

Wry, I. A.....St. Albans

Washburn, Chat.....Brandon

Williams, N. G.....Bellows Falls

Walker, N. S.....Clarendon Springs

Woodward, J. S.....Enosburg

Winslow, H. L.....North Clarendon

Weed, E. D.....Hinesburg

Warren, Rufus.....Montpeller

Wheelock, H. R.....Montpeller

Wright, J. J.....So. Hero

Whipple, Obed Jr...North Pomfret

Wheeler, F. H.....Proctorsville

Whitney, Ed...Minneapolis, Minn.

Wright, H. S.....North Williston

Willard, D. S.....North Hartland

Whitney, H. O.....Essex Junction

Whitelaw, F. R.....Randolph

Wheeler, W. H.....South Pomfret

White, A. R.....Burlington

Wallace, Sidney.....Waterbury

Walker, H. W.....South Woodstock

Williams, J. B.,

Glastonbury, Conn.

Webb, J. T.,...New Braintree, Mass.

Weed, B. W.....St. Albans

Whitman, C. D., Fisher's Island,

New London, Conn.

Warner, B. F.....East Burke

Wilson, James Ex. Sec'y Agr.,

Tama, Iowa

Winslow, Chas. L....No. Clarendon

NOTE—Your Secretary would consider it a favor if the members would notify him of any changes or corrections in the above list.

LIST OF CREAMERIES, SHIPPING STATIONS, CHEESE FACTORIES AND CONDENSARIES OPERATING IN VERMONT IN 1918.

PREPARED BY THE STATE DEPARTMENT OF AGRICULTURE.
ADDISON COUNTY.

Creameries.

Name of Plant.	Name of Operator.	Post Office Address.	Name of Maker or Manager.	Post Office Address.
Elgin Springs Cry.	Elgin Springs Cry. Co.	Vergennes, R. D. 1.	Eugene Bandette	Vergennes, R. D. 1
Donahue's Cry.	W. C. Donahue	Monkton	W. C. Donahue	Monkton
Green Mt. Cold Spgs. Cry.	Starksboro Coop. Cry. Co.	Starksboro	Henry Besette	Starksboro
Lake Dunmore Cry.	L. Dunmore Cry. Co.	Salisbury	Roy Fletcher	Salisbury
Lincoln Cry.	Lincoln Coop. Cry. Co.	Lincoln	F. C. Chapman	Lincoln
Orwell Cry.	Tait Bros.	Springfield, Mass.	C. L. Munger	Orwell
Reef Bridge Cry.	Reef Bridge Cry. Ass'n	Middlebury, R. D.	L. B. Whitman	Middlebury, R. D.
Vergennes Cry.	J. F. Donahue	Vergennes	J. F. Donahue	Vergennes
Middlebury Cry.	Coons Ice Cream Co.	Burlington	A. M. Hayward	Middlebury
Noye's Cry.	K. E. Noyes	Salisbury	K. E. Noyes	Salisbury
Green Mt. Valley Cry.	B. L. Birdsell	Bristol, R. D.	B. L. Birdsell	Bristol, R. D.

Shipping Stations.

Sheffield Farms Sta.	Sheffield Farms Co., Inc.	New York City	H. C. Debuque	Ferrisburg
C. Brigham Sta.	C. Brigham Co.	Cambridge, Mass.	H. C. Buker	No. Ferrisburg
Maine Cry. Sta.	Maine Cry. Co.	Providence, R. I.	Roy Kingman	Ferrisburg
Sheffield Farms Sta.	Sheffield Farms Co., Inc.	New York City	S. B. Bacon	Vergennes
Sheffield Farms Sta.	Sheffield Farms Co., Inc.	New York City	C. A. Briggs	New Haven Jct.
Sheffield Farms Sta.	Sheffield Farms Co., Inc.	New York City	Chas. Cunningham	Vergennes, R. D.
Middlebury Coop. Sta.	Addison County Dairy Co.	Middlebury	N. C. Nelson	Middlebury
Bronx Farm Sta.	Bronx Farm Co., Inc.	New York City	E. J. Williams	Salisbury
C. Brigham's Sta.	C. Brigham Co.	Cambridge, Mass.	A. J. Hayes	Leicester Jct.
C. Brigham's Sta.	C. Brigham Co.	Cambridge, Mass.	G. N. Blake	Bristol

Cheese Factories.

Nichol's Ch. F'ct'y	A. M. Sherbino	Bridport	A. M. Sherbino	Bridport
West Bridport Ch. F'ct'y	West Bridport Cheese Ass'n	Bridport	E. J. Woodbury	Bridport
Shoreham Ch. F'ct'y	Dickerson & Brown	Shoreham	C. E. Dickerson	Shoreham
Red Clover Ch. F'ct'y	Red Clover Cheese Ass'n	E. Shoreham	Oscar Poulin	Middlebury, R. D.

List of Creameries, Shipping Stations, Cheese Factories and Condensaries—(Continued.)

BENNINGTON COUNTY.

Shipping Stations.

Name of Plant.	Name of Operator.	Post Office Address.	Name of Maker or Manager.	Post Office Address.
Castleton Dairy Co., Sta.	Castleton Dairy Co.	New York City	John Shaw	W. Rupert
Schade's Milk Sta.	Wm. Schade	Yonkers, New York	C. A. Sheldon	Rupert
Hood's Sta.	H. P. Hood & Son	Charlestown, Mass.	J. Cramer	W. Rupert
Manchester Cry.	Manchester Dairy Co.	Manchester	F. D. McGuire	Manchester
Dorset Ch. F'ct'y	Dorset Cheese Ass'n	Dorset	C. L. Lee, Sec'y	Dorset
No. Rupert Ch. F'ct'y	No. Rupert Cheese Co.	Pawlet	Frank Root, Sec'y	Pawlet

Cheese Factories.

CALEDONIA COUNTY.

Creameries.

Pine Hill Cry.	Mrs. S. A. Buck	Wheelock	Mrs. S. A. Buck	Wheelock
Mountain View Cry.	Mt. View Coop. Cry. Co.	W. Barnet	J. Strawbridge	W. Barnet
Lamoille Valley Cry.	Lam. Val. Coop. Cry. Ass'n	E. Hardwick	W. A. Vancor	E. Hardwick
Montgomery's Cry.	J. S. Montgomery	E. Hardwick	J. S. Montgomery	E. Hardwick
St. Johnsbury Cry.	E. St. Johns. Coop. Cr. Co.	E. St. Johnsbury	B. C. Colburn	E. St. Johnsbury
Danville Cry.	Danville Cry. Ass'n	Danville	F. S. Morse	Danville
Lyndonville Cry.	Lyndonville Cry. Ass'n	Lyndonville	H. M. Dresser	Lyndonville
No. Danville Cry.	No. Dan. Coop. Cry. Ass'n	N. Danville	O. V. Eley	N. Danville
Barnet Cry.	Barnet Coop. Cry. Co.	Barnet	Perley Ayres	Barnet
McIndoes Cry.	McIndoes Cry. Co.	McIndoes	R. M. Sanborn	McIndoes
E. Barnet Cry.	E. Barnet Cry. Co.	E. Barnet	Chas. Parker	E. Barnet
So. Peacham Cry.	So. Peacham Cry. Co.	So. Peacham	D. F. McPhee	
So. Walden Cry.	Holland Cry. Co.	Springfield, Mass.	F. Miner	So. Walden
Noyesville Cry.	F. A. Messer	Montpeller	R. L. Lawson	Noyesville
Sheffield Cry.	Closed			
Passumpsic Sta.	Plymouth Cry. Co.	Shipping Stations.	A. C. Granger	Passumpsic
Plymouth Cry.	Plymouth Cry. Co.	(Boston, Mass.)	H. M. Goodwin	St. Johnsbury
Alden Bros. Cry.	Alden Bros.	(Boston, Mass.)	B. C. Wilson	Hardwick

CHITTENDEN COUNTY.

Creameries.

Jonesville Cry.	Borden Cond. Milk Co.	Richmond	C. C. Fuller	Jonesville
Lake Champlain Cry.	W. B. Johnson	Essex Jct.	A. D. Lavine	Essex Jct.
Westford Cry.	Westford Cry. Co.	Westford	H. E. Pierce	Westford
The Cooperative Cry.	The Coop. Cry. Co.	Underhill	Roy Montgomery	Underhill
Johnson Cry.	L. W. Johnson	Huntington	L. W. Johnson	Huntington
Donahue's Cry.	M. F. Donahue	Essex Jct.	M. F. Donahue	Essex Jct.
Burlington Coop. Cry.	Burl. Coop. M. Pro. Co.	Burlington	M. Atherton	Burlington
White's Cry.	White's Pure Milk Pro. Co.	Burlington	A. R. White	Burlington
	Shipping Stations.			
Colchester Cry.	Borden Cond. Milk Co.	Richmond	E. W. Fisher	Colchester
Brown's River Cry.	Borden Cond. Milk Co.	Richmond	John Hopkins	Essex
Shelburne Cry.	Shelburne Coop. Cry. Co.	Shelburne	W. H. Prindle	Shelburne
Richmond Cry.	Rich. Farms Coop. Cry. Co.	Richmond	M. J. Quinn	Richmond
Cloverdale Cry.	Bryant & Chapman Co.	Hartford, Conn.	W. H. Gomo	Cambridge
Whiting Sta.	D. Whiting & Son	Boston, Mass.	H. E. Mooney	Milton
Borden's Sta.	Borden's Cond. Milk Co.	Richmond	W. D. Agen	Underhill
Sheffield Farms Sta.	Sheffield Farms Co., Inc.	New York City	I. Booska	Charlotte
Lake View Cry.	Lake View Coop. Cry. Co.	Charlotte	P. R. Auchman	Charlotte
Hood's Sta.	H. P. Hood & Son	Charlestown, Mass.	Ed Shores	Milton
Oak Hill Sta.	Borden Cond. Milk Co.	Richmond	C. G. Austin	Williston
Hood's Sta.	H. P. Hood & Son	Charlestown, Mass.	Fred James	No. Williston
Borden's Sta.	Borden Cond. Milk Co.	Richmond	P. E. Demick	Hinesburg
	Condensaries.			
Borden's Condensary	Borden Cond. Milk Co.	Richmond	F. H. Shepardson	Richmond
Borden's Condensary	Borden Cond. Milk Co.	Richmond	P. E. Demick	Hinesburg
	ESSEX COUNTY.			
	Creameries.			
Brighton Cry.	Simmons & Hammond	Portland, Maine	H. O. Humphrey	Island Pond
Trout Brook Cry.	A. M. Baker	Concord	J. R. Ralston	Concord
	Shipping Stations.			
H. P. Hood & Son	H. P. Hood	Charlestown, Mass.		Concord
H. P. Hood & Son	H. P. Hood	Charlestown, Mass.		E. Concord

List of Creameries, Shipping Stations, Cheese Factories and Condensaries—(Continued.)

FRANKLIN COUNTY.

Creameries.

Name of Plant.	Name of Operator.	Post Office Address.	Name of Maker or Manager.	Post Office Address.
Maple Leaf Cry.	E. Trahan	Swanton	E. Trahan	Swanton
Clover Leaf Cry.	C. O. Harvey	Fletcher	H. C. D. Smith	Fletcher
Franklin Co. Cry.	Franklin Co. Cry. Ass'n	E. Berkshire	L. H. Button	E. Berkshire
Maple Hill Cry.	Maple Hill Cry. Inc.	E. Berkshire	D. A. Johnson	E. Berkshire
Missisquoi Valley Cry.	Maple Hill Cry. Inc.	Richford	P. O. Noso	Richford

Shipping Stations.

Green's Corners Cry.	H. P. Hood & Sons	Charlestown, Mass.	H. E. McNamara	Green's Corners
Wachusett	E. H. Thayer	Enosburg Falls	E. E. Derby	Enosburg Falls
Fairfax Cry.	H. P. Hood & Sons	Charlestown, Mass.	H. J. Conner	Fairfax
D. Whiting & Son	D. Whiting & Sons	Boston, Mass.	H. E. Mooney	St. Albans
Alden Bros.	Alden Bros.	Boston, Mass.	F. E. Brady	E. Fairfield
Sheldon Cry.	Hood & Sons	Boston, Mass.	M. D. Mack	Sheldon
Hood's Plant	Hood & Sons	Charlestown, Mass.	Jim Berry	Sheldon Jct.
Hood's Plant	Hood & Sons	Charlestown, Mass.	F. M. Adams	E. Fairfield
Hood's Plant	Hood & Sons	Charlestown, Mass.	W. J. Jennings	Fairfield
Hood's Plant	Hood & Sons	Charlestown, Mass.	A. E. Doney	Highgate Center

Condensaries.

Federal Packing Co.	Federal Packing Co.	Enosburg Falls	O. L. King	Enosburg Falls
Hood's Plant	Hood & Sons	Charlestown, Mass.	C. Douglass	St. Albans
Maple Hill Cry.	B. H. Combs	East Berkshire	B. H. Combs	E. Berkshire

GRAND ISLE COUNTY.

Creameries.

So. Hero Cry.	So. Hero Coop. Cry. Ass'n	So. Hero	Thos. Orne	So. Hero
Pearl Creamery	Grand Isle Coop. Cry. Co.	Grand Isle	Fred Chadwick	Grand Isle
Jordan Bay Cry.	R. H. Wilcox	Isle La Motte	F. A. Brown	Isle La Motte
Grand Isle County Cry.	G. I. Co. Coop. Cry. Ass'n	Shipping Stations.		
Boston Jersey Cry.	H. P. Hood & Sons	Grand Isle	F. A. Briggs	Grand Isle
		Charlestown, Mass.	S. C. Spaulding	Alburgh

LAMOILLE COUNTY.

Creameries.

Mt. Mansfield Coop. Cry.	| Mt. Man. Coop. Cry Ass'n	| Stowe	| R. M. Metcalf	| Stowe
Gold Brook Coop. Cry.	Shipping Stations.			
Stafford & Sons Cry.	| G. Brook Coop. Cry. Ass'n	| Stowe, R. F. D.	| H. G. Fuller	| Stowe, R. F. D.
C. Brigham Co.	| Stafford & Sons	| Morrisville	| Stafford & Sons	| Morrisville
C. Brigham Co.	| C. Brigham Co.	| Cambridge, Mass.	| A. B. Judd	| Morrisville
	| C. Brigham Co.	| Cambridge, Mass.	| M. C. Washburn	| Cambridge Jct.

ORANGE COUNTY.

Creameries.

Stafford Cry.	| Stafford Cry. Co.	| So. Stafford	| W. P. Stone	| So. Stafford
Green Mt. Cry.	| Green Mt. Cry. Co.	| West Topsham	| W. E. Hood	| West Topsham
Randolph Coop. Cry.	| Randolph Coop. Cry. Co.	| Randolph	| A. E. Johnson	| Randolph
Washington Cry.	| Washington Cry. Ass'n	| Washington	| O. E. King	| Washington
Farmers Coop. Cry. Co.	| Farmers Coop. Cry. Co.	| East Corinth	| L. A. King	| East Corinth
Topsham Coop. Cry.	| Topsham Coop. Cry. Co.	| Topsham	| C. E. McLam	| Topsham
Wells River Cry.	| Wells River Cry. Ass'n	| Wells River	| H. L. Lyster	| Wells River
Orange Co. Cry.	| Orange Co. Cry. Ass'n	| Chelsea	| L. R. Brown	| Chelsea
Williamstown Cry.	| Lyndonville Cry. Ass'n	| Lyndonville	| A. H. Jewett	| Williamstown
West Fairlee Cry.	| Lyndonville Cry. Ass'n	| Lyndonville	| F. R. Haywood	| West Fairlee
Tunbridge Coop. Cry.	| Tun. Coop. Cry. Ass'n	| Tunbridge	| H. Whitney	| Tunbridge
Vershire Creamery	| Vershire Coop. Cry. Ass'n	| Vershire	| L. S. Flint	| Vershire
Corinth Cry.	| Lyndonville Cry. Ass'n	| Lyndonville	| F. D. Little	| Corinth
Lake Morey Cry.	| Lake Morey Cry. Co.	| Fairlee	| Wm. J. Phillips	| Fairlee
C. Brigham Co.	Shipping Stations.			
Boston Jersey Cry.	| C. Brigham Co.	| Cambridge, Mass.	| J. J. Stimels	| Randolph
Newbury Cry.	| H. P. Hood & Son	| Charlestown, Mass.	| J. B. Broadhead	| No. Thetford
Hood's Milk Sta.	| Lyndonville Cry. Ass'n	| Lyndonville	| G. A. Doe	| Newbury
Highland Cry.	| H. P. Hood & Son	| Charlestown, Mass.	| E. F. Corliss	| Boltonville
	| Plymouth Cry. Co.	| Boston, Mass.	| J. W. Layten	| West Newbury
Bradford Cry.	Cheese Factories.			
	| Lyndonville Cry. Ass'n	| Lyndonville	| F. H. Bickford	| Bradford
	Condensaries.			
	| H. P. Hood & Son	| Charlestown, Mass.	| L. F. Butman	| Randolph

List of Creameries, Shipping Stations, Cheese Factories and Condensaries—(Continued.)
ORLEANS COUNTY.

Creameries.			
Name of Plant.	Name of Operator.	Post Office Address.	Name of Maker or Manager.
Orleans Cry.	J. G. Turnbull Co.	Orleans	Orleans
W. Charlestown Cry.	J. G. Turnbull Co.	Orleans	W. Charlestown
Derby Line Cry.	J. G. Turnbull Co.	Orleans	W. Charlestown
Lowell Cry.	J. G. Turnbull Co.	Orleans	Lowell
Missisquoi Valley Cry.	Miss. Vall. Coop. Cry. Co.	So. Troy	So. Troy
Albany Cry.	J. G. Turnbull Co.	Orleans	Albany
Clyde River Cry.	U. S. Bean	Orleans	E. Charlestown
Black River Cry.	Jersey Cry. Ass'n	Lowell, Mass.	Craftsbury
Jersey Star Cry.	N. C. Stevens	Irassburg	Irassburg
Meadow Brook Cry.	F. A. Messer	W. Glover	Glover
Caspian Lake Cry.	H. P. Hood & Son	Montpeller	Greensboro
Columbia Cry.	J. G. Turnbull	Charlestown, Mass.	No. Troy
Norton Mills Cry.		Orleans	Norton
Shipping Stations.			
Newport Ctr. Cry.	H. P. Hood & Sons	Charlestown, Mass.	Newport Center
H. P. Hood & Sons	H. P. Hood & Sons	Charlestown, Mass.	Barton
Glover Cry.	Lyndonville Cry. Ass'n	Lyndonville	Glover
Derby Center Cry.	H. P. Hood & Sons	Charlestown, Mass.	Derby Center
H. P. Hood & Sons	H. P. Hood & Sons	Charlestown, Mass.	Orleans
Condensaries.			
RUTLAND COUNTY.			
Creameries.			
Proctor Cry.	Vermont Marble Co.	Proctor	Proctor
Hortonville Cry.	Tait Bros.	Springfield, Mass.	Orwell, R. D.
Otter Creek Cry.	Jones Bros.	Brandon, R. D.	Brandon, R. D.
Champlain Valley Cry.	Tait Bros.	Springfield, Mass.	Fair Haven
Shipping Stations.			
C. Brigham Sta.	C. Brigham Co.	Cambridge, Mass.	Wallingford
C. Brigham Sta.	C. Brigham Co.	Cambridge, Mass.	Wallingford

C. Brigham Sta.	C. Brigham Co.	Cambridge, Mass.	D. F. Andrews	Danby
C. Brigham Sta.	C. Brigham Co.	Cambridge, Mass.	A. W. Needham	So. Wallingford
C. Brigham Sta.	C. Brigham Co.	Cambridge, Mass.	C. L. Graves	Danby
Castleton Dairy Co. Sta.	Castleton Dairy Co.	New York	C. E. Cuthbert	Castleton
Maple Hurst Cry.	Castleton Dairy Co.	New York	Henry Juckett	West Pawlet
Tait Bros. Sta.	Tait Bros.	Springfield, Mass.	J. A. Wells	Benson
Tait Bros. Sta.	Tait Bros.	Springfield, Mass.	J. J. Jackson	Fair Haven
Tait Bros. Sta.	Tait Bros.	Springfield, Mass.	W. J. Stebins	Fair Haven
Tait Bros. Sta.	Tait Bros.	New York City	D. E. Dexter	Poultney
Tait Bros. Sta.	Tait Bros.	New York	J. J. Cunningham	Florence
Tait Bros. Sta.	Tait Bros.	New York	W. T. Corey	Fair Haven
Tait Bros. Sta.	Tait Bros.	Springfield, Mass.	C. L. Lamphere	West Rutland
Tait Bros. Sta.	Tait Bros.	Springfield, Mass.	P. O. Eddy	Brandon
Tait Bros. Sta.	Tait Bros.	Springfield, Mass.	E. S. Corliss	Rutland
Tait Bros. Sta.	Tait Bros.	Springfield, Mass.	W. W. Smith	Brandon
Tait Bros. Sta.	Tait Bros.	Springfield, Mass.	H. D. Smith	Mt. Holly
Tait Bros. Sta.	Tait Bros.	Springfield, Mass.	A. B. Seward	E. Wallingford
Tait Bros. Sta.	Tait Bros.	Springfield, Mass.	Walter Hill	Middletown Springs
Tait Bros. Sta.	Tait Bros.	Springfield, Mass.	Ed. Cramer	West Pawlet

Cheese Factories.

Gilt Edge Cheese F'ct'y	Gilt Edge Cheese Ass'n	Castleton	Mack Smith	Castleton
Maple Brook Cheese F'ct'y	A. N. Cook	Middletown Springs	A. N. Cook	Middletown Springs
Gleason Cheese F'ct'y	F. L. Russell	Cuttingsville	W. E. Bruce	Cuttingsville
Union Cheese F'ct'y	Union Cheese Co.	Middletown Springs	Chas. Waters	Middletown Springs
West Pawlet Cheese F'ct'y	C. H. King	West Pawlet	C. H. King	West Pawlet
Riverside Cheese F'ct'y	W. W. Jenks	West Rutland	W. W. Jenks	West Rutland
Cold River Cheese F'ct'y	P. E. Plumley	No. Clarendon, R. D.	P. E. Plumley	No. Clarendon
Eureka Cheese F'ct'y	Floyd Pratt	Middletown Springs	Floyd Pratt	Middletown Springs
Blakeley Cheese F'ct'y	Frank Blakeley	Pawlet	Frank Blakeley	Pawlet
Mt. Holly Cheese F'ct'y	Geo. Woodbury	Cuttingsville	Geo. Woodbury	Cuttingsville
Crowley Cheese F'ct'y	A. W. Crowley	Belmont	A. W. Crowley	Belmont
Aldrich Cheese F'ct'y	W. E. Aldrich	Cuttingsville	W. E. Aldrich	Cuttingsville
E. Poultney Cheese F'ct'y	East Poultney Cheese Co.	Poultney	Geo. Baker	East Poultney

List of Creameries, Shipping Stations, Cheese Factories and Condensaries—(Concluded.)
WASHINGTON COUNTY.

Creameries.

Name of Plant.	Name of Operator.	Post Office Address.	Name of Maker or Manager.	Post Office Address.
Montpelier Cry.	H. P. Hood & Sons	Charlestown, Mass.	H. Jillet	Montpelier
Marshfield Coop. Cry.	Mars. Coop. Cry. Ass'n	Marshfield	C. M. Lilly	Marshfield
Barre Cry. & C. Stor. Co.	Barre Cr. & Cold Stor. Co.	Barre		Barre
Winooski Valley Cry.	A. G. & G. F. Bralley	Fair Haven, Mass.	E. E. Grant	Waterbury
East Montpelier Cry.	E. Mont. Coop. Cry. Co.	East Montpelier	John Bond	East Montpelier
No. Montpelier Cry.	No. Mont. Coop. Cry. Ass'n	No. Montpelier	E. C. Hillis	No. Montpelier
Bryant's Cry.	A. E. Bryant	Northfield	A. E. Bryant	Northfield
East Calais Cry.	E. Calais Coop. Cry. Ass'n	East Calais	Guy Bancroft	E. Calais
Cabot Cry.	F. A. Messer	Montpelier	Wm. O'Brien	Cabot
So. Woodbury Cry.	So. Wood Coop. Cr. Ass'n	So. Woodbury	W. H. Watkins	So. Woodbury
Warren Coop. Cry.	Warren Coop. Cry.	Warren	H. N. Paquette	Warren
Mad River Valley Cry.	N. E. Belden	Waitsfield	N. E. Belden	Waitsfield

Shipping Stations.

C. Brigham Sta.	C. Brigham Co.	Cambridge, Mass.	F. B. Butler	Waterbury Center
Bordens Sta.	Bordens Cond. M. Co.	New York	C. D. Oliver	Waterbury
Moretown Cry. Sta.	Moretown Cry. Co.	Moretown	F. H. Sayer	Moretown
Middlesex Cry. Sta.	Moretown Cry. Co.	Moretown	L. B. Palmer	Middlesex
Plainfield Cry. Sta.	Deerfoot Farm Co.	Boston, Mass.	C. B. Story	Plainfield
No. Calais Cry. Sta.	J. S. Tabor	No. Calais	J. S. Tabor	No. Calais

WINDHAM COUNTY.

Creameries.

North River Cry.	No. River Cry. Ass'n	Jacksonville	E. S. Murdock	Jacksonville
Deerfield Valley Cry.	Deerfield Valley Cry. Ass'n	Wilmington	F. A. Rist	Wilmington
Windham County Cry.	Windham Co. Cry. Ass'n	Newfane	C. A. Nichols	Newfane
Wardsboro Cry.	Wardsboro Coop. Cry. Co.	Wardsboro	Miss H. Halonon	Wardsboro
Guilford Coop. Cry.	Guilford Coop. Cry. Asso.	Brattleboro, R. D.	F. C. Bates	Brattleboro, R. D.
Holbrook's Cry.	R. I. Holbrook	Townshend	R. I. Holbrook	Townshend
West River Cry.	West River Cry. Co.	So. Londonderry	W. C. Hall	So. Londonderry

WINDSOR COUNTY.

Creameries.

Elm Valley Cry.	Belknap & Sons	Cavendish	Cavendish
Hoods Cry.	H. P. Hood & Sons	Charlestown, Mass.	Woodstock
Middle Valley Cry.	Myron J. Buck	East Bethel	E. Bethel
W. Riv. Valley Coop. Cry	W. R. Val. Coop. Cry.	Rochester	Rochester
Maplehurst Cry.	J. H. Mussey	Stockbridge	Stockbridge
Silver Lake Cry.	F. El. Allen	Barnard	Barnard
S. & F. Cry.	F. E. Fowler	So. Royalton, R. D.	So. Royalton, R. D.
Moore's Cry.	E. F. Moore	So. Royalton, R. D.	So. Royalton, R. D.
Harrington Cry.	H. H. Deansmore	Bethel	Bethel
Sherburnes Cry.	A. E. Sherburne	No. Pomfret	No. Pomfret
Sharon Coop. Cry.	Sharon Coop. Cry.	Sharon	Sharon
West Hartford Cry.	A. L. Dow	West Hartford	West Hartford

Shipping Stations.

Whiting Cry Sta.	D. Whiting & Son	Boston, Mass.	Hartland F. Corners
Whiting Sta.	D. Whiting & Son	Boston, Mass.	Ascunneville
Hood's Sta.	H. P. Hood & Sons	Charlestown, Mass.	Norwich
Child Bros. Cry Sta.	Child Bros.	Waltham, Mass.	Brownsville
Manchester Cr'm Co., Sta	Manchester Cry. Co.	Windsor	Windsor

Cheese Factories.

Pymouth Cheese F'ct'y	Plymouth Cheese Co.	Plymouth	Plymouth
Nickles Hopsas Ch. F'ct'y	Nickles Hopsas	So. Royalton, R. D.	So. Royalton, R. D.

Where no other state is mentioned the address is Vermont.

Owing to war conditions a number of the creameries, shipping stations and cheese factories have been temporarily closed or combined with others into larger ones.

The condensaries are counted with the shipping stations because they often ship milk and cream. All those plants which have one or more large vacuum condensing pans are listed as condensaries.

Several of the creameries, ship milk and cream at odd times and several make some cheese. A number of the shipping stations also make butter and cheese. The cheese factories often make a little butter and ship milk and cream.

PROCEEDINGS
OF THE
Twenty-fourth Annual Meeting
OF THE
Vermont
Maple Sugar Makers'
Association

Held at St. Albans, Vermont
January 3, 4, 5, 1917



ST ALBANS, VT.
ST. ALBANS MESSENGER CO., PRINT
1917

LETTER OF TRANSMITTAL.

To His Excellency Horace F. Graham, Governor of Vermont:

Dear Sir:

In accordance with the requirements of law, I have the honor to transmit to you the Twenty-fourth Annual Report of the proceedings of the Vermont Maple Sugar Makers' Association.

Respectfully submitted,

SAMUEL A. MERRIFIELD,

Secretary.

June 29, 1917,
Williamsville, Vt.

Twenty-fourth Annual Meeting
OF THE
Vermont
Maple Sugar Makers'
Association.

Wednesday Evening Session, 8:00 P. M.

MR. A. A. CARLETON, PRESIDENT, IN THE CHAIR.

PRESIDENT CARLETON:

Ladies and Gentlemen: We have met in this our Twenty-fourth Annual Convention, in St. Albans, and the Good Maker has seen fit to give us a sugar snow to remind us of the sweet things. I have the privilege, if it is not too late, of wishing you all a Happy New Year.

It is always our custom to open our meeting with prayer, and the Rev. H. L. Thornton, of St. Albans, will ask God's blessing upon the proceedings of this convention.

INVOCATION.

BY REV. H. L. THORNTON.

Oh, God, our Heavenly Father, we look unto Thee as the giver of every good and perfect gift, of all things which are for the convenience of mankind. We ask Thy blessing upon this convention and the people who have come to discuss ways and means for the furthering of their interests, and we realize that all these things first come to Thee. We thank Thee that Thou hast given us guidance, and that this intelligence has worked out these methods and means whereby we have a larger production of the things which are for our comfort and convenience.

Bless all that shall be said; may the words of our mouth and the meditation of our heart be acceptable in Thy sight, Oh, Lord, our strength and Redeemer. Amen.

PRESIDENT CARLETON: The word welcome, we all know what it means, as Vermont is famous for her hospitality and her welcome to the homes of each farmer and each city in the state. That we were sure of a welcome in St. Albans, we all knew, and now we will listen to the kind words of welcome from Mayor Maun of St. Albans.

ADDRESS OF WELCOME.

MAYOR J. E. MAUN, ST. ALBANS.

Mr. Chairman, Ladies and Gentlemen:

A short time ago I attended a convention similar to this, in one of the neighboring cities, and the Mayor took a good deal of pains to explain what a heavenly place that city was. It put me in mind of a little incident that happened when I was conductor of a train, ten or twelve years ago. In going through Northfield one night we had a special party that was going west. My recollection is that they were shoe makers, and were moving from Massachusetts to a new factory that the company had erected in the west. You remember that there is a nice common just in front of the depot, in Northfield, and in the center of the common there is a fountain, and just back of that there is a soldiers' monument erected in memory of the soldiers of Northfield that lost their lives in the Civil War. Among this company there was an Irishman, and as the train moved out he looked out and said, "What town did you say this was?" And the brakeman said, "It is Northfield." The Irishman said, "This must be a fine, healthy place to live in, they have only one monument in the cemetery."

Your chairman introducing me as Mayor puts me in mind of a story. A year or two ago, just previous to one of our city elections, I was walking up the street in the evening, and there were a couple of my Irish friends in the doorway, and I stopped and talked, and they didn't know who I was, and Tom said, "I understand Mr. Maun is not going to run for mayor", and John said, "I think the superintendent of streets would make a good mayor." Tom replied, "John, you are wrong, leave the superintendent of streets alone. Anybody can be mayor, but it takes a darned good man to be superintendent of streets".

When a man gets down to the meridian of life, looking back forty years seems like a dream. Forty years ago I was living in one of the smaller towns in the central part of

the state, and well do I remember breaking into the sugar place in the spring of the year,—the large oxen and the old-fashioned bob sled, and the snow came up to the oxen's noses. After we got the track broken the next thing was to get the sap buckets down from the wood-shed chamber. Most of them were home made, and the hoops were like the hoops on the old-fashioned sugar barrel. The first thing to do was to turn the sap bucket bottom side up and drive the hoops down. Then we built the fire, and when the water was boiling how we doused the sap buckets down, and occasionally the hoop would break, and the boy that couldn't take a stick and make a hoop was not considered much of a sugar maker. The sap spouts were iron, and we drove them into the bark under the auger hole in the tree, then drove the nail in the tree about six inches below the sap spout, which was made by the country blacksmith, and there was a hook on the nail, going up under the hoop of the tub; and we boiled the sap in the old iron kettle. It was the same kettle that we used to make soap in, in the spring of the year, and to heat the water when we butchered the hogs in the fall, and it was impossible to get all of the bristles out of it, and the cake sugar made in that old kettle would put you in mind of concrete. But, gentlemen, those were happy days, and that was the sweetest sugar that ever was made. (Applause).

There was a boy, the son of a neighbor, that shared with me my pastimes. We went to the same school together, we played the same games, we fished in the same brooks. After a time we drifted apart, our lives followed different channels, but I hope we have both tried to live so as not to bring discredit upon ourselves or the little country town where we lived, and nothing gives me greater pleasure tonight, in extending to you the welcome of the city, than to think that the man who is going to respond was my playmate in my boyhood days, Victor I. Spear. (Applause).

Now, gentlemen, I will say a few words of explanation about the city of St. Albans. It is like the core to the apple, the town extends clear around the city, and if our city should ever be invaded, before the invaders reach us they would have to fight the people who live in the town, for the reason that we are so closely affiliated by marriage and otherwise that we are divided in name only. This extends back and takes in the whole of Franklin county, as well, and most of you know that this is one of the best farming towns in the State of Vermont, and we can go back into Franklin county, on account of our close proximity to the

Canada line, and take in the city of Montreal, and a good many towns in the southeast part of the province. We have a large French population, some of them most trusted citizens, and in behalf of these people I extend to you the welcome of the city. Let us hope your presence among us will be a source of profit to yourselves as it is a pleasure to us, and when you go away from St. Albans you will go away with a feeling of pleasure, and when you look back you will look back with a feeling that when you met in St. Albans you met in the home of your friends. (Applause.)

PRESIDENT CARLETON: I was reading a short time ago a little item that might perhaps come in under this head. As we have the freedom of the city, I saw the question asked, "When is a man supposed to have the freedom of the city?" The answer was, when his wife took a vacation to the country.

The one whom we have chosen to respond to the address of welcome is one of our old charter members who has been with the Sugar Makers' Association, I think, ever since it was organized, and one who takes a deep interest in the sugar industry of the State of Vermont, and it gives me great pleasure to introduce to you our trusted friend, Victor I. Spear, of Randolph.

RESPONSE TO ADDRESS OF WELCOME.

VICTOR I. SPEAR.

Mr. President, Ladies and Gentlemen:

It is with a feeling of some satisfaction that I can think back upon a former meeting, at St. Albans, of this Association, and to what it has meant, as I believe, for the maple sugar interests of the State and for the members of this Association in particular.

I wish to thank the Mayor for his kind words of welcome at this time and to hope that we shall get as much inspiration and good from this meeting as we did from the meeting here nineteen years ago. As the president has said, I believe that since the organization of this Association that I have missed attending only one in the twenty-four years. That meeting I happened to be in the west and could not be present.

It has been a matter of great interest to me, from the beginning, and I will tell you how this Association happened to be organized. It was organized in the town of Morrisville by about eight or ten persons that belonged to the Dairymens' Association. It was organized because the members of the Board of Agriculture at that time, of which I was one, in going about the state had noticed the poor conditions of the maple sugar industry. We had been from one town to another and noticed the price at which good maple products were being sold, seeing it loaded on the cars at four and a half cents a pound for the western people to mix with their cane sugar. We considered that that kind of market for maple goods could have but one effect, and that would be to ruin the industry and the people who were interested in it; and from the impression that three or four of the members of the Board got was inaugurated the initial membership of the maple sugar association at Morrisville, as I have stated. Among those who commenced with us at that time, quite a good number have closed their work, but as I look back upon the work that has been done by the organization, and can think of those who have labored in this field, I believe that it is not saying too much to say that there are few, if any, organizations in Vermont that have returned a greater profit to the Vermont farmers, through their efforts, than has the organiza-

tion of the maple sugar makers. It is not entirely due to the work of this organization that we are receiving to-day three or four times as much for the product as we did twenty-five years ago, but the association has helped mightily in reaching that end. It deserves, and should have, the united support of all the sugar makers of Vermont.

I believe we don't do half enough publicity work; all the people don't know what the organization is doing, and they fail to realize the great market that there is for maple goods, when it ought to be before the people. Our president has had considerable experience in the past in the line of publicity, and I believe that he could tell you of the great effect and the great good that comes from these exhibitions.

Now, I had not intended to go into the matter of the maple sugar industry at this time, but simply to place before you the fact that this Association has been of great benefit to the maple sugar makers of the state, not only the members of this Association, but the industry as a whole, and it is a fact that though the membership of any organization can thrive alone, yet what the members have done has gone out in benefit to the people who are not members as well as to the members themselves.

We are pleased to return here to St. Albans and get a new inspiration, for it was nineteen years ago, I think in this hall, that there came quite a little turning point in my own career. On that occasion I was assigned to have a paper before the Association, and my subject was given to me. They wanted a paper upon the best methods, or some other methods, on marketing maple goods through co-operative effort. I studied the matter over and got up as good a paper as I could, and read it here, and the result was that some of the members of the Association got together after we had got through here, and organized just about the same kind of a company that I had advocated, and set me to running it, and I have been running it ever since.

The fact of my having that paper here in St. Albans has probably had quite a little to do with the course of my lifework, and I hope and expect that from all the good influences that we will get here at St. Albans during the next two or three days, will come as much enthusiasm, and good use of it, as we gained at our former meeting here. (Applause.)

PRESIDENT CARLETON: "The Sugar Maple as a Nature Study" will be presented to us by Hon. Amos J. Eaton, Member of the State Board of Agriculture and Forestry, from South Royalton.

THE SUGAR MAPLE AS A NATURE STUDY.

HON. AMOS J. EATON, SOUTH ROYALTON, VT.

Ladies and Gentlemen:

I feel some hesitation in speaking before this audience tonight. I hardly know where I am at. Night before last our good Governor Gates, who I suppose belongs to Franklin county, although the rest of our state claims to share him, called me up on the 'phone and asked me a question, and as I replied, he said, "Eaton, I believe you are lying." I notice that the Mayor of St. Albans half apologizes for telling the truth. If the Governor is correct I am getting pretty near home.

"Bare must be the shadeless way,
And bleak the path must be
Of him, who having open eyes,
Has never learned to see,
And so has never learned to love
The beauty of a tree."

(Sam Walter Foss.)

In the maple tree we have a combination of beauty and utility, things which do not always go together. There is not a more beautiful tree in New England than the sugar maple, and there is scarcely a more useful tree. Aside from the demand for the maple as a sugar producer, the timber is used wherever strength and durability are called for, and in Vermont maple wood is the standard, as hickory is further South, and oak is in the West. If we undertake to classify sugar making we are in doubt as to whether to place it in the agricultural department or forestry department. If we adopt the opinion of some of our writers, that agriculture should be confined entirely to the tilling of the soil, then sugar-making belongs in the forestry department. What do we think of when we speak of a forest? We always think of some great tract of land covered with a dense growth of immense trees, "the forest primeval," the "deep uncultivated wild where noontide glory scarcely ever smiled", but we forget that it is neither the size of the tract nor bigness of the trees that constitute a forest, but

it is the character of the growth that covers the ground.

Three years ago our maple trees produced an abundance of seed, and the next spring the little maples came up in my asparagus bed as thick as the hairs on a dog's back. *There* was a forest, and your sugar orchards are real forests, so maple sugar is certainly a legitimate forest product, although unlike most forest products, we are able to take the sugar and leave the forest.

This is said to be an age of iron. It is claimed that our boasted civilization is built upon iron, but I want to tell you that we are very largely dependent on the product of the forest for our existence. The average Vermonter is rocked in a wooden cradle; he eats his meals at a wooden table, seated in a wooden chair; he warms himself by a wood fire; he lives in a wooden house; he plays ball with a wooden bat and slides on a wooden sled; he studies his lessons at a wooden desk and his wayward feet are turned to the right track by a wooden switch; he takes his sweetheart riding in a wooden buggy and is married before a wooden altar; at his office he reads the war news from a wooden newspaper; he sweetens his breakfast cakes with wooden syrup and to finish his meal he uses a wooden tooth-pick, he worships the God of his fathers seated in a wooden pew, and when he dies he is buried in a wooden casket, inside a wooden box. In life and death he is always dependent upon and supported by the products of the forest.

We sometimes wonder, as we look out over the country, where the trees come from. We know where they go to. When I was a boy fifteen or sixteen years old, my father sent me out to chop down the biggest tree in the woods. It was a big maple four and a half feet on the stump, and went up sixty feet to the first limbs. I went to chopping, and in just sixty minutes I had that tree down. Can you imagine the pride that I felt? I—a boy—had cut down a tree that had withstood the storms and winds of more than one hundred winters. I jumped up on the tree-trunk and walked back and forth. I had not done very much because Nature had helped me. That tree was hollow, and I had to chop only four or five inches of wood. But the maple has certain characteristics of its own. That hollow in that tree went less than twelve feet, and when we sawed off a twelve foot log, the body of the tree was perfectly sound. If that had been a beech or elm it would have been punky the whole length, and if a basswood it would have been hollow the whole length. We had a basswood in which somebody had chopped a hole, and one day I dropped a lighted match down the hole. Presumably the match went out, and

I went on about my work. As I was going to the barn I heard a roaring, and when I located the sound, there was a big stream of smoke coming from the top of that basswood tree, but it didn't kill the tree, for it lived for several years until it was finally cut for wood.

If we study the trees carefully we shall find certain family characteristics. If we notice a grove of young seedlings we will wonder where the seeds came from to produce those trees, because all the trees of Vermont originally have come from seed. As we go north on the Boston & Maine we will find pine and white birch until we get above Wells River, and then we find yellow birch and spruce. In Windham county shag bark hickory are not very scarce, and we find a few more in the Champlain valley. If we climb any of our higher mountains the first tree that we lose is the pine, then the hemlock and maple, and then higher, the spruce and beech, and higher still we have the balsam fir and the birch, and after we pass the timber line and get up on the bleak summits we will still find an occasional birch clinging in the crevices, the trunk lying flat on the ledge, and it is not only living but it is blossoming and producing fruit. Some of you will criticise that word "fruit" and will say the birch is not a fruit tree. Fruit is the package in which the seed are produced, whether it is an apple a butternut or a pine cone. Those birches are fruiting almost at the summit of our bare mountains. They do not grow to perfection there, but they grow where nothing else will.

As we study more carefully the characteristics of the different trees and the different varieties of trees we will find not only do the different varieties have family characteristics, but we will find individuality of the tree. An old gentleman up at Sutton used to say "there is just as much difference in folks as in anybody", and I want to tell you there is just as much difference in trees as in folks. We have good trees and bad trees and indifferent trees. Some trees produce their fruit from two kinds of blossoms borne on the same tree, they have both staminate and pistillate blossoms. That is the case with the butternut, but the maple produces staminate blossoms on one tree and pistillate blossoms on another, and you gentlemen who are selecting trees, to plant for shade trees, if you will get only those which are staminate instead of pistillate you will not be bothered with seedlings under the tree. When the trees are ten or twelve feet high the staminate trees do not leaf out quite as early in the spring as the pistillate, so select the young maples that leaf out last and

you will stand a pretty good chance of getting staminate trees. We have no trees in Vermont but what do produce seed, but how does the seed get from place to place? We have in my own town two red pine seedlings, and so far as I know there is not a red pine seed tree within ten miles. How did the seed get there? I don't know. When I was a small boy my father plowed a piece of pasture land, and the kale came up on that plowed land. Where did it come from? Father said the devil sent it. Someone had grown crops on that land that had weeds in it, and the weed seeds had been buried, and when brought to the surface they germinated and grew.

Wherever a tree grows there was a seed that came from some where. Most of our trees have wings attached to the seeds so that the seeds can fly. My own farm was at one time covered with a heavy growth of pine and those trees were all cut except one and for fifty years there was only one pine tree in sight. Now the children and children's children of that tree extend down the valley for miles. Pine seeds have exceptionally good wings. Maples have a similar arrangement, although the seed is much heavier than the pine. In a strong wind the winged seed will sail a long ways. Probably you have all watched the squirrels shucking maple seeds and burying them in the leaves ready for next winter's food. Sometimes they forget where they are buried, or else bury more than they need, and in the spring they come up and we would be surprised if we could know how far those seeds are carried. There are other animals that have to do with the carrying of these seeds. I remember finding a family of white-footed mice which had stored a half bushel of maple seeds in a hollow tree and there are more than a dozen different varieties of mice, moles and shrews that have something to do with the carrying and planting of these seeds.

I spoke of the individuality of the maple tree. I have at home a row of great maples down the highway, planted something over a hundred years ago, and for years I tapped them and gathered the sap. There was one tree in that row that absolutely refused to run sap. Right beside it was a smaller tree, apparently a seedling from the larger one, and as that grew and become large enough to tap I bored it, but it would not run sap. It is now eighteen inches in diameter, but I can get no sap from it. The other trees in that row are all good sugar trees. You have all seen some great tree where the bucket was always running over, and you thought it was due largely to location. Isn't it possible it was due to the individual tree? You will

almost always find one or two other trees near that are also unusually good yielders. Haven't you an improved strain of maples there, that if developed would increase the quantity of sap that you could receive. We are only just beginning in the sugar industry in Vermont. I am looking forward to the time when we shall be planting maple sugar orchards and caring for them as carefully as some of you do your apple orchards.

Grandmother used to say she was glad when it rained in sugaring, so that the water would soak into the trees and dissolve the sugar. She had the same theory as the city fellow who chopped a maple tree into chips and boiled them to get the sugar out, and when he learned his mistake he tapped his apple trees the next fall to get some cider. I asked a group of boys where sugar was made, and they said, "In the sugar house." I said, "No." They thought I was lying, but we understand that the sugar is all made in the green leaves of the tree so that anything which improves and increases the leaf area of a tree increases the ability of the tree to make and store up sugar; while anything that decreases the leaf area of the tree must decrease the ability to make and store sugar, so in caring for our sugar orchards let us do all that we can to keep the trees thrifty and give them a large top and big leaf surface, and that is especially true of the young sugar orchards.

We have quite a number of good orchards just large enough to begin tapping, and some of those sugar orchards are so thick they need thinning, so that the sunlight can get in, and I think we will have no conflict with the forestry people when they are advocating the growing of timber, if we open up our maple groves a little more and give the trees a chance to spread out, and in that way we will improve the trees, and years later reap the result.

Tradition tells us that cane sugar was discovered by a monkey and that maple sugar was discovered by an Indian squaw. It seems to me that man's boasted superiority is not what he claims it to be, because not only does he lack the keen perception of his better half, but he also lacks the natural instinct of the ape. I thank you. (Applause.)

PRESIDENT CARLETON: Our next speaker will close the program for the evening, with the exception that Mr. Eaton has kindly consented, at the close, to give us a recitation from Drummond.

There has been a slight alteration in the program for Thursday evening. There will be moving pictures in the

Bellevue theater tomorrow forenoon on the Co-operative Agriculture of the Northwest.

The next number on the program, "The Origin and History of the Maple Sugar Industry", will be given by one who has made it a study and who is a tree surgeon and makes it his business to work among the trees of the state,—shade trees around in different cities and villages. I take great pleasure in introducing to you Mr. C. O. Ormsbee of Montpelier.

ORIGIN AND HISTORY OF THE MAPLE SUGAR INDUSTRY.

BY C. O. ORMSBEE, MONTPELIER, VT.

Pure sugar is of two kinds. In chemical parlance they are known at the present time as sucrose and glucose. Years ago, when I first began to study the problems of sugar making, they were known as cane sugar and grape sugar, respectively. Popularly, they were and still are known as sugar, and molasses, and, unless we go far into chemical details, the principal difference is that the first will crystallize, or grain on evaporation, while the second cannot be crystallized by ordinary processes.

Chemically sugar is composed of the elementary substances of hydrogen, oxygen and carbon, and nothing else. All of these elements are found in every organic substance, when in a natural condition, and chemists have so combined them, synthetically, as to produce an artificial sugar. Pure air consists of oxygen and nitrogen and nothing else. Atmospheric air, such as we ordinarily breathe, consists of pure air with an admixture of watery vapor and carbonic acid, in varying quantities, and it is possible, that, sometime in the future, sugar may be manufactured from the foul and filthy air of our mines and factories and stables and unventilated bed-rooms, leaving pure air as one of the by-products.

These elements are so combined, chemically, so as to form sugar, at some period in the growth of every plant, both in the sap and in the seeds of fruit, but it is found in but very few plants in such a state of purity, or in quantities sufficient to make its extraction and separation possible by any ordinary process, or both practicable and profitable by any process whatsoever. And I will submit a brief historical description of these plants. First is the cane and bamboo. These are both natives of the far East, and were cultivated for their sugar content in both China and India, more than twenty-five hundred years ago. In which country the sugar industry originated is not definitely known, and only those who are thoroughly familiar with all the languages and the literature of the people of both of those countries at that date are qualified to express any opinion in the matter. And even these few men differ in

opinion. Neither is it known which of the two plants was first cultivated for its sugar bearing qualities, though the cane is by far the more profitable, and I believe that the bamboo has never been grown for this purpose outside of the East and the East Indies. In growth, cultivation and methods of extraction of the sugar, the plants are identical, and there are no separate statistics of the extent of either industry. And it is said, also that the original plant, from which sugar cane has been developed by cultivation is not known, and that sugar cane is not found growing wild in any country, except in those localities where it has escaped from cultivation.

It is not probable that sugar was known by the people whom we regard as the ancients, for there is no mention of it in any of the Hebrew writings, or in the literature of any kindred nation. It was probably unknown except by hear-say, to the Greeks and Romans, for, in Grecian literature it is mentioned but once, and then as a honey found in the bamboo. In Roman literature there are three allusions to a substance which has been interpreted as sugar. In the first it is called "Indian Salt". The second writer says that in India there is found honey in a certain kind of reed, and Pliny, writing in the second century speaks of this honey as being found in both India and Arabia, but says that of India is more renowned. Every authority that I have read says that the cultivation of sugar cane was confined to India and China until the fifth century, but this passage would seem to indicate otherwise. But, at any rate it was grown extensively in Arabia during the fifth century, and had come to be regarded, not as an article of food, or even as a luxury, but as a highly prized medicinal agent. In the eighth century the Moors carried plants of the sugar cane to Europe, where, for upwards of four hundred years, it was grown exclusively in Spain. In the thirteenth century it was introduced into Sicily and Cyprus, and, early in the fifteenth century into the Madeira and Canary islands, and along the western coast of Africa. And, twenty-five years after the first voyage of Columbus, it had been planted extensively in the West Indies and in Brazil.

Prior to 1420, the method of manufacture seems to have been merely to crush and press the cane, and to boil the juice, but, in this year, an Italian, a native of Venice, invented a method of refining the product that was deemed so important and valuable that the government paid him a sum equivalent to \$120,000.00 for his discovery. Sugar now lost none of its prestige as a medicinal agent, but

become also, a highly prized luxury among the very wealthiest classes of people. So highly prized was it, that, while in the early part of the fourteenth century its price was but \$13.60, a pound, it increased to an average of \$23.70, between the years of 1340 and 1400. And, though the supply increased by many fold during the next one hundred years, the demand increased even more rapidly, and the price reached its maximum of \$27.80 a pound in 1482, and there is a story to the effect that the daughter of an English nobleman instructed the physician who had been summoned to attend her on account of some trifling indisposition, to prescribe for her, half an ounce of sugar daily. From this time the price gradually decreased, until, one hundred years later, the price on the London market was but \$18.00 a pound. From this time there was in general a rapid decline, though sometimes with great fluctuations, until, at the beginning of the nineteenth century, the average price is reported to have been in the vicinity of thirty-eight cents a pound.

But sugar cane was not grown on any portion of what is now the North American continent until 1751, when an attempt was made to grow it in Louisiana. The people, however, were wholly unacquainted with the cultivation of the plant or the extraction of the sugar, and, although some sugar was made, the experiment was a failure. In 1791, the experiment was again tried, and this time, laborers who were familiar with every part of the work were sent from the West Indies. The Creole variety, however, was planted, and this proved so unadapted to either the soil or climate that but little progress was made. About 1810, the Ribbon variety was introduced into Georgia, and subsequently into Louisiana. This variety proved successful, and, with its variations, is the variety now almost universally grown in the United States. And sugar cane has succeeded so well in the United States, that, according to the census of 1910, just one hundred years later, it had become an important crop in nine different states, with a total acreage of 746,849 acres, and a total output of 653,716,000 pounds, with a value, including the molasses of \$29,869,300.00.

Sugar is also manufactured from the sap of at least six varieties of palm trees all of which are cultivated in the Ganges river valley in India. The trees begin to yield sap when five years old, are mature at eight, but continue yielding until thirty or more. A mature tree is said to yield an average of 350 pounds of sap, of which ten per cent is sugar, thus making the average yield of sugar in the

vicinity of thirty-five pounds per tree. This sugar is known as "jaggery" which is the English corruption of the native name, and, without an absolute knowledge of the matter, I believe that the root of the original name, is identical with the original root from which our word, "sugar", is derived. The process of manufacture of jaggery is very similar from first to last to that of making maple sugar. The total output is said to be more than 100,000 tons, annually. It is largely consumed locally, but a great deal is packed in bags, holding one hundred pounds each, and which one writer describes as resembling bags of black mud but not as nice to handle, and exported to England where it is refined. I very much doubt if any quantity has ever been sent to the United States, but the output is equal to one fifth of the output of cane sugar in this country.

In Arabia, sugar is made by expressing and evaporating the juice of dates. The product, under native processes of manufacture, is a thick, syrupy liquid, half way between sugar and molasses, and is much prized by the natives. From all that I can learn, it seems to be made chiefly from those dates that are of too low a grade to be profitably marketed, and the output is between 4,000,000 and 5,000,000 pounds annually. In Spain it is manufactured in a similar manner from certain kinds of grapes. I am unable to give any estimate of the quantity manufactured, but it is said that some 4,000 or 5,000 pounds are annually exported to New York City, it being shipped directly to a few of the Spanish merchants in that city.

In 1747, German chemists discovered the presence of sugar in the juice of beets, but no practical use was made of the discovery for a period of about fifty years. Then, during the Napoleonic wars, when the ports of continental Europe were blockaded, both France and Germany turned their attention to the beet as a source of sugar. Improvements were made in the methods of extraction and purification of the sugar, and a careful selection and breeding of the plants developed strains of beets that were especially rich in sugar content, and, half a century later, both of these countries were exporting sugar. The United States became interested in the manufacture of beet sugar at a comparatively early date, but, apparently made no very rapid progress, for it was not until 1838, that David Child, of Massachusetts, made the first successful experiment along this line. He extracted six per cent of sugar, but, although he received a bounty of three cents a pound, the cost of manufacture was so great that the experiment resulted in a financial loss and was discontinued. The next successful

experiment was made in Illinois in 1863, and this, also resulted in a heavy financial loss. The truth is that, to manufacture beet sugar with profit requires an equipment costing, together with the working capital fully half a million dollars and neither of these enterprises had scarcely more than one tenth of that amount. The next attempt to manufacture beet sugar in the United States was made in California, in 1870. This enterprise was supplied with ample funds and the experiment proved successful and profitable, and the factory is still in operation. But the birth of the beet sugar industry in this country, really dates from the tariff changes of 1890. I believe that there are now sixty-five beet sugar factories in successful operation in the United States, and, according to the last census the output was 1,003,364,000 pounds of sugar, with a value including that of the molasses of \$48,122,383.00.

Beets are grown for sugar making purposes in twenty different states, covering a total acreage of 364.093 acres, producing 3,932,857 tons of beets for which the sum of \$19,880,724.00 was paid.

During the year of 1909, there were produced 14,060,206 pounds of maple sugar, and 4,106,428 gallons of maple syrup, equivalent to a total of 46,911,630 pounds of sugar, having a combined value of \$5,177,809.00.

The manufacture of sorghum was conducted in twenty-nine different states, and the total output was 16,532,000 gallons, equivalent to 132,256,000 pounds of sugar, and having a value of \$5,288,000.00. Sorghum is made by expressing and evaporating the juice of a plant very much resembling the corn plant and the entire operations is conducted upon the farm where it is grown. It is exceedingly rich in cane sugar, but contains, also, a small amount of starch which makes the crystalization of the sugar impracticable from an economical point of view, and it is always sold as syrup. In addition to all this the production of glucose amounted to 769,660,210 pounds, with a value of \$17,922,514.00, and that of grape sugar to 159,060,478 pounds with a value of \$3,620,816.00. These last are by-products of corn, produced in the manufacture of starch.

So that the total domestic production of sugar of all kinds, is equivalent to 2,762,496,238 pounds, having a total value of \$110,100,812.00. In addition to this, we imported during that year 4,094,545,936 pounds of sugar, valued, exclusive of the duty, \$106,349,367.00 and 31,292,165 gallons of molasses with a value of \$1,367,362.00 equivalent to 250,336,320 pounds of sugar, or a total of 4,344,883,256 pounds of sugar with a total value of \$107,717,729.00, ex-

clusive of the duty. Adding two cents a pound, which, I understand will cover this expense, gives a total value of imported sugar of \$194,615,379.00. Summing it all up gives a total consumption of 7,097, 278,494 pounds of sugar, at a cost, at wholesale prices of \$304,716,191.00. This gives a per capita consumption of seventy-seven pounds of sugar, annually, and at retail prices the daily expenditure for sugar amounts to considerably more than one million dollars.

Maple sugar is made in commercial quantities in Canada, principally in the province of Quebec, and in nineteen of the United States, but upwards of ninety per cent is produced in the valley of the St. Lawrence river and its tributaries. As already stated the total amount produced in the United States is equivalent to 46,911,630 pounds. The total product of Canada is equivalent to about 30,000,000 pounds, making a grand total of 76,911,630 pounds, which would allow about eleven ounces per capita if divided equally among the 100,000,000 people of the United States. Owing to the limited number of trees it is only possible to double the output of the United States, and to treble that of Canada. Sugar was first made from the maple tree, in Canada. When, is unknown, and it is a matter of doubt whether the originators were of the white or red race. Of late years there has been a marked tendency on the part of a certain class of people to ascribe to the Indians an intelligence and a civilization which they did not possess, and a great number of really valuable papers have been published in an attempt to prove that maple sugar was made more or less extensively by the Indians prior to the advent of the white people. I intended, at one time to follow these evidences through, discuss them, one by one, and show the fallacy of each, but time and space will not permit. Let it be sufficient to say, that, while the Indians undoubtedly were acquainted with the saccharine qualities of maple sap, and quite likely were able to reduce it by evaporation to some degree of density, it is extremely doubtful, if, with their equipment, they were able to reduce it sufficiently to make a crystalized sugar. Moreover, when the white race entered Canada, sugar was quoted in the European markets at prices around fifteen dollars a pound. The main object of the French people in coming to Canada was to trade with the Indians. Now, had maple sugar been known among the Indians, it seems strange that it was not enumerated among the articles of trade with those people. Instead, there is no mention made of it in any of the writings of the early explorers for upwards of one

hundred years after trade relations had become established. Even Champlain, who wrote a very minute account of the Indians and their customs and manners, and also of the country and its resources, makes no mention of maple sugar. There are a few earlier references to something of native manufacture that might be interpreted as maple syrup, but the first allusion to maple sugar among the Indians describes it as being made with European utensils.

At one time, I have not been able to learn the exact date, the Dutch East India Company, which, at that time held the monopoly of the sugar trade between Europe and the East, investigated the possibilities of the maple tree as a source of sugar, and the agents reported adversely. It has been said, and the statement used in corroboration of the arguments in favor of the Indian origin of maple sugar, that, for a great many years the Hudson Bay Company held a monopoly of the sugar trade with the Indians. In refutation of this statement I will just mention the fact that the Hudson Bay Company was an English company organized to trade with the Indians that were tributary to the English settlements around Hudson bay, and restricted by their charter from venturing elsewhere than in the territory drained by the tributaries of that bay. The valley of the St. Lawrence river was then owned by France. When this nation ceded its territory in America, to England, at the close of the French and Indian war, the Montreal company was formed, and a rivalry between these two companies sprung up, so intense that it often amounted to actual warfare, and it was not until the former company absorbed the latter, in about 1820, that the Hudson Bay Company had any dealings in any part of the maple sugar territory. Sugar was made in Canada, however, more than one hundred years prior to this date, but merely for home consumption on the farm on which it was made. I cannot find that it became in any manner an article of commerce, or even of trade or barter for many years after this date. But Canada made slow progress, reaching its maximum production of 225,000,000 pounds of sugar in the decade of 1880 to 1890. The people clung to the caldron kettles and old wooden troughs and made but little attempt at the improvement of quality until about thirty years ago, when men from Vermont went to that country carrying with them improved ideas and improved equipments and began an educational crusade. Canada now produces maple sugar of as a good quality in every respect as can be produced in Vermont, and that quality finds a ready market in its own cities at prices considerably higher

than the Vermont sugar makers receive for their own product of equal grade. Only twenty per cent of the total product, however, is of this grade.

Turning now to New England, we would naturally expect that the manufacture of maple sugar would date from the earliest settlement of the country. But it is not so. The early settlers were not of the class that was accustomed to indulge in a diet of sugar at a price of upwards of ten dollars a pound, and they had not developed a taste for it. Doubtless they became acquainted with the pleasant flavor of the sap at a very early date, and quite likely they had learned to concentrate it by evaporation. But their object was to build comfortable homes for themselves and their families, and to provide them with the necessities of life, and they had little use for this stuff. Consequently, there is no mention of maple sugar in New England until 1720, just one hundred years after the landing of the Pilgrims. In that year a Mr. Dudley published, in the Philosophical Transactions of the Royal Society, a short account of a low grade of sugar that was found in small quantities in the sap of the maple tree. He described the process, with the troughs for catching the sap and the potash kettles for boiling it, and regarded the production of sugar from the maple tree as an interesting novelty but of no practical use. But the people, and especially the younger generation began to develop a taste for this product of the maple tree, and, forty years later, when the early settlers began to flock into Vermont, they almost invariably made a little sugar the following spring after their arrival at their new homes.

But it was not a marketable commodity. We read in the histories of the early settlements of the various towns, not only in Vermont, but in Massachusetts and New Hampshire as well, that the settlers would burn huge piles of wood, gather the ashes, leach them, boil the resulting lye, and carry the residue in the form of potash to the nearest store, and there dispose of it at the rate of six to eight cents a pound, taking in exchange necessities of life that they could not themselves produce, and paying, therefor, an exorbitant price; but there is no allusion to a sale of maple sugar. We read, too, in a Vermont paper published along about 1805, the advertisement of a store-keeper who informs the people that he will buy their boiled cider, dried apples, dried beef, salt pork and potash, and give them in exchange, West India goods, such as sugar, molasses, rum and tobacco, but not one word is said in regard to maple sugar. The truth is that the labor of making the sugar was so great, and the quality so poor that it could not be

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sold in competition with brown sugar from the West Indies.

Originally all tapping was done with an axe. There were two methods. One was known as 'notching', and consisted merely of cutting into the side of the tree precisely as though one were about to cut it down. The other was termed 'boxing', and required considerable skill with the axe to do the work properly and neatly. It consisted in the cutting of a diamond shaped mortise squarely into the side of the tree. The first was the earliest method to be employed, but the settlers, even with their improvident ways of handling the forests, soon saw that it meant the total destruction of the maple groves within a very few years, and it was superseded by the second, though it was in frequent use within the memory of men with whom I talked when a boy. It is difficult to determine just when the auger was first used as an instrument for tapping trees. It was used, however, prior to 1810, but not generally, and, even at that date, it was regarded as a shiftless method, fit only for those not skilful enough in the use of the axe to properly box a tree. At that time the two inch auger was the size used, but with the substitution of smaller sizes its use became more popular, but it was not until 1840 that it entirely superseded the axe.

The troughs used for catching the sap, to which allusion has been made were long, clumsy, and necessarily heavy affairs, hewed from a solid log, and generally capable of containing from four to six gallons of sap. From their nature it was necessary, either to set them on the ground at a distance of three or more feet, and connect them with the tree with a long, clumsy spout hewed from a splinter, or to build a solid and substantial platform for them to rest upon. They were incapable of being stored, and, at the close of the season, the spout was placed inside and they were turned up on end against the tree to await another season. Sometimes they were charred, both inside and out, to increase their durability, but at best they became worthless after four or five years of exposure. So great was the labor involved, that, to tap ten trees, make the necessary troughs and spouts and fasten them in place was considered a good day's work for a man.

Until about 1790, the axe was used to make an incision just beneath the wound into which the spout was inserted. But about that time some genius living in Massachusetts invented a sort of a semicircular chisel which could be used for this purpose, and also for splitting the spouts from blocks of straight-grained wood. About the same time, there was invented, also in Massachusetts, an axe with

a blade but an inch and a half in width, to be used in boxing the trees. In 1795, Jeremy Belknap, writing from Dartmouth, in New Hampshire, says that great quantities of maple sugar are made in the town, and usually a full year's supply is made. And he mentions it as a matter of peculiar interest and importance that a Mr. Whipple has a set of vats for storing the sap and a house built especially for boiling it.

This, then, was the status of the maple sugar industry at the beginning of the nineteenth century. Log troughs for catching the sap, larger troughs for storing it, potash kettles, and the domestic kettles of the kitchen for boiling it, an implement scarcely one degree removed from the axe, for tapping the trees, and another equally crude for manufacturing the sap-spouts. Compare these with the limited amount of sugar that could have been made with such implements, and you will see that the maple sugar industry was but a small factor in the sugar trade of the world. But, crude as these implements were, they are about all that Vermont needs to give thanks to the people of other states for. For, aside from these there has been scarcely one single improvement in the sugar making art, or in any sugar-making implement that did not originate in Vermont.

The development of the cooper's trade made it possible to substitute hand-made wooden tubs for the heavy and clumsy old log troughs, and this substitution was begun in Washington county as early as 1805. Possibly it may have begun at an earlier date in some other localities. Certainly it did not begin as early in some other places, so, perhaps this may be taken as an average date. But the troughs were used to some extent as late as 1820. They may have been in use in other parts of New England at a later date. I was told by a native Missourian that they were in use in that state after the close of the Civil war, and have been in use in certain parts of Canada at a much more recent period. Another of the triumphs of the cooper's art was the large stave sap-holders, or storage tanks, thousands of which are still in use. The earliest of these of which I have any knowledge was about 1810. But the first of the wooden sap tubs were a curiosity. They were designed to stand upon the ground, and the lower ends of the staves projected some four or five inches beyond the bottoms in order to prevent decay. They would hold about four gallons, and, in order that they might not be easily overturned, the bottoms were very wide, and the tops very narrow. Incidentally they kept the sap cold and sweet, for, once let a tub full of sap freeze solid and often

a part of the ice would remain for several days before it could be removed.

In 1801, a child was born in Montpelier, who, as he grew to manhood, developed a remarkable, and almost wonderful mechanical ingenuity. This was Oren Cummings, and, to him, the maple sugar industry owes a big debt of gratitude, for, with the single exception of the substitution of metal sap-spouts for the old wooden affairs, not one improvement has been made since the advent of wooden tubs, that did not originate in his fertile brain. During his life-time he invented more than one hundred patentable devices, but only once was he prevailed upon to invest sufficient money to secure his rights by a patent, and that one device proved a failure. Others took his ideas, and perfected his devices to a point that he never dreamed of, and thus we have an immense array of sugar making implements, and a long list of patentees, but the original idea was put forth by Oren Cummings, of Montpelier.

Simultaneously with the use of the auger in tapping, came the use of a round plug with a small hole bored through the center. The plug was driven tightly into the tap-hole, and the sap tricked through the smaller hole and fell upon the long spout which conducted it into the tub. This was the outfit that greeted young Cummings as he came upon the scene in his father's orchard. He improved it by boring a hole through the sides of the tubs and hanging them upon the plugs. For this he was soundly thrashed for having diminished the capacity of the tubs. He retaliated by inventing a nail with a long, broad and thin head upon one side, which could be inserted under the wooden hoop of the tub. Not quite satisfied with this, he devised a little loop made of ash, and similar in appearance to the handle of a basket. This was inserted between the tub and the uppermost hoop, and hung upon the nail. The coopers took advantage of this, and substituted a wire loop, and thus the tubs were made with an attachment for hanging them to the tree. And somewhere, along in the 'thirties, he invented a hook for attaching the bucket to the spout, which, with unimportant variations, is used by most of the manufacturers of sap-spouts even at the present time. Later he devised a cover, made of boards, and attached to the tree by means of a wire hook at each side.

Prior to 1820, practically all the sap was gathered by hand since there seemed to be no tank in which it could be hauled on a sled without slopping and thereby wasting. In that year, Mr. Cummings, then but twenty years old,

built a gathering tub, small at the top, and large at the bottom and fitted with a cover very similar in all respects to the stave gathering tanks now in use. And he also contrived a wooden faucet by means of which the sap might be drawn off. The next year he made a pan for boiling the sap, and this pan was in existence in the loft of his sugar-house within my recollection. It was simply a strip of sheet iron some ten or twelve feet long, ten or twelve inches deep, and with board sides. It proved a failure, more through the fault of the arch, which had no under draft, than through any defect in its construction. But, by 1825, he had surmounted all difficulties along this line, and was boiling sap, in flat bottomed pans, and five years later, maple sugar became a staple commodity on the Boston market. It had previously been known in Boston, but only in small quantities, but, from this time until the present it has been an important article of commerce. And until about 1850, used almost wholly, not as an article of luxury, but as an adulterant for the coarse brown sugar of the West Indies.

The method of marketing was to cook the sugar rather hard, pack it in wooden tubs holding about fifty pounds, and set it away to cure. After the lapse of six or eight weeks, a hole was bored in the bottom, the tub was placed upon another tub, and the molasses was allowed to drain into the lower tub. This operation required several weeks, and the product, though materially reduced in weight, was known as 'drained sugar', and brought a relatively much higher price. Prior to the advent of the railroads, it was held until winter and then sent to market on sleds drawn frequently by oxen. This method of preparing the sugar for market continued until within my own recollection, and I can remember seeing the buyers bore holes in the bottom of the tubs to sample the sugar and see if it was properly drained. Often the sugar would be sold at the local store, or exchanged for other commodities, but the draining was always completed before it was sent to Boston. Maple syrup does not appear to have been marketed, or even to have been kept for home use until a much later date, and the molasses was used in its place. It was also used in making vinegar, which, in those days was wholly of domestic manufacture, and was an important by-product of the maple sugar industry. It was also used extensively in the making of the birch and spruce beers which our grandfathers called "baby drinks," the black, thick, and half fermented stuff imparting an alcoholic flavor without

the alcoholic effect. With the passing of drained molasses, the manufacture of these beers became a lost art. It was also extensively used in domestic cookery, and the children of the present day, who pride themselves on being able to wear their grandfather's collars for belts, will never know the flavor of the brown bread and baked beans that formed a staple article of diet when we older men were boys.

From 1825 to 1840, there was a steady improvement in methods of manufacture, but no radical improvement in the type of the implements. Comfortable sugar houses, in the place of the open air boiling places became universal. Tin began to take the place of wood in the manufacture of the buckets. Sheet iron spouts, open on the top, and designed to be driven into the bark just below the tap-hole, almost wholly superseded the wooden tubular spouts. Small, shallow pans setting cross-wise of the arch took the place of long, deep, single pans. State fairs offered prizes for the best quality of maple sugar. Wide spread attempts were made to improve the quality of the product, and both milk and eggs came into extensive and almost universal use in clarifying it. Spouts to conduct the sap from the gathering tank to the storage tanks came into use, and Mr. Cummings constructed a series of spouts to conduct his sap from a central point in the woods, to his sugar house which was situated some forty rods distant and but a few steps from his kitchen door.

But the decade between 1840 and 1850, was marked by many radical improvements. As before stated Mr. Cummings would not invest the money necessary to protect his ideas by patent, nor would he hire help to assist him in putting his devices upon the market. But others stepped in, purloined his ideas, and, in some instances improved upon his inventions and put many of them upon the market. I am not certain that I am listing the improvements in their chronological order, but he invented a sap spout, made of tin or sheet iron, and very similar to the 'Canco,' now on the market. He also connected his pans with the storage tank, but, for the time, was obliged to control the flow of sap from the rear pan on one side to the rear pan arch, with four pans on each side. From the back pan on one side, each succeeding pan sat a little lower, and was connected with the pan next higher by means of a pipe through the side of the rear pan. This gave a continuous flow of sap from the rear pan on one side to the rear pan on the other side, in which pan the syruing off was done. This was regarded as a great improvement, and the style of arch and pan came into extensive use in the larger

orchards but it required the sap from fully one thousand trees to operate it economically. About this time he constructed a system of weights and pulleys which were attached to the pans and so balanced, that, when the sap in any pan reached a shallowness approaching the danger point, it would be lifted from the fire. He also placed a float inside the feeding tank, and connected it with a finger on the outside, which would indicate the exact depth of sap in the feeding tank, and, when this was nearly empty, it would open connections with the larger storage tank. It was during this decade, also, that he made extensive experiments to ascertain what benefit would result to the tree by plugging the tap-holes at the close of the season, and finally arrived at the same conclusion that the Experiment Station reached at the close of a series of experiments made sixty years later.

During the next decade 1850 to 1860 he invented a pan with a corrugated bottom, so similar in style to the evaporator patented by Cooke in 1871, that I am fully of the opinion that Cooke had this pan in mind when he devised his original patent which has since been improved by the patents of Williams, Butler, Corey and Tabor, and is now known as the Williams Improved Bellows Falls Evaporator. It was during this decade that he invented the self-feeder, which automatically controls the flow of sap from the feeding tank to the pan, and superseded the faucet which required almost constant attention. The first float that he used in connection with the device was a shingle. This bothered by becoming water-soaked and varying its buoyancy. Then he substituted a tin pan, but finally devised a cylinder, and his self-feeder, as finally perfected is almost identical with that now used upon several of the leading types of evaporators. As finally perfected, he cut the patterns from paste board and took them to a tinsmith to have them made of tin. The tinsmith, after looking them over, handed them back and said that he, "Would be damned if he would spend his time making any such a fool contraption". It was during this decade that he invented the sap-heater, now seldom used in the more modern plants, but which consisted of a large box, setting down into the arch, with flues through which all the smoke and heat must pass before entering the chimney. This economized all the heat that any type of evaporator can do, but it was difficult to clean between the flues and so became unpopular after the lapse of twenty years, when the production of the very lightest grade of product became the chief desideratum. During the latter years of this decade

he began work upon the siphon as a vehicle for conveying the sap from one pan to another. He used a piece of lead pipe and experimented for a long time, bending it in a great variety of shapes but was troubled by steam collecting in the pipe and preventing the flow of sap. Finally he hit upon the plan of soldering a funnel-shaped reservoir upon the top of the siphon in which the steam might collect. This device was a success except for the fact that it was impossible to tell whether the siphon was in working order or not, and it was not until 1870, that he succeeded in remedying this defect by substituting a glass tube in the place of the tin reservoir. And this, I believe, completes the list of his inventions along the line of the maple sugar industry, for none of which did he ever receive one cent of royalty.

And this brings us to the introduction of the first of the patented evaporators. I had intended to follow with a description and a historical sketch of many of the most important types of evaporators, as well as of other sugar making implements. But to do so would require a volume, and I have already overstepped my allotted time, so I will close with the remark, that, in spite of the many improved patterns of evaporators that we see on exhibition here to-night, the perfect evaporator will be invented only when one shall be devised in which gasoline, or kerosene, or denatured alcohol shall take the place of wood for fuel. And the perfect sugar will be made only when it shall be possible to crystalize it by congelation instead of by evaporation.

THURSDAY MORNING.

**SOME PHASES OF CO-OPERATIVE ORGANIZATION
WORK.**

J. C. GILBERT, U. S. DEPARTMENT OF AGRICULTURE.
ILLUSTRATED.

INTRODUCTION.

It is with the greatest pleasure that the Department of Agriculture has the privilege of showing you some phases of the co-operative organization work. These two films have nothing whatever to do with maple syrup or sap or sugar, but have to do with the principles of co-operative organization, a subject in which we believe you are all interested. The films will show some of the processes through which the producers of small fruits in the Northwest have gone in order to bring about a situation which has bettered their condition along co-operative lines. The films speak for themselves. If I see any opportunity to explain I shall take advantage of the chance. We are very, very glad to have this opportunity to show the maple syrup and sugar people of Vermont what has been accomplished along the line of co-operation, for co-operation is one of the prime needs in New England.

FILMS.

This scene is taken in what is known as the Puyallup Valley not far from Mount Tacoma. During the berry season a great many of the Pacific Coast Indians are employed as well as school boys and girls, who go out into the fields during vacation time.

The berry fields are not owned co-operatively, but individually, just as you own your own maple trees.

Each picker has a card, and "getting punched" means that he is credited on the card with the number of pints of berries that he has picked.

Here is where the co-operative side of the question begins. From now on the Growers' Association handles the product. Mr. Grower is handing to the Association employe the result of his labors.

Reports issued by the offices in the different markets over the city have made it possible for the Association manager to distribute his crops over large territories, thus avoiding over-stocking.

Co-operation without inspection has proved a failure. Inspection is the safeguard of co-operative effort.

What you see is the completed load in one of the cars. The timbering is used for bracing.

In order to take out the natural heat of the berries a pre-cooling system has been installed and cold air has been forced into the car, forcing out all warm air, and this pre-cooling of the car is previous to supplying the car with its initial load of ice.

Co-operation between organizations and railroads makes possible the berry special train.

Of the berries, "they sell what they can, and what they can't they can". In one of the former pictures you noticed the pickers were sorting the berries to be shipped and those to go to the cannery. Those which go to the cannery are packed in single layer trays. Cannery berries are accredited to the growers by weight. Cleanliness in this cannery is a matter of principle. They have found that it is one of their greatest assets. Not only is the sugar purchased by the Association for the use of the cannery, but for the individual use of the growers who belong to the Association.

Perhaps in this picture they appear to be going to a great deal of pains over a small matter in canning fruit, but they find they can get a better price if they handle the berries carefully.

The Office of Markets maintains in the principal markets of the country reporters who interview large produce houses in order to find the wholesale price which products are bringing on the market. No one produce man's word is taken.

A great many men are interviewed, and thus the consensus of opinion throughout the market is obtained. After a reporter has secured his market quotations from the wholesale trade these are summarized in the form of telegrams, which are sent out to all parts of the country after having been edited by the clerical force in the Washington office. The bulletins which were sent to the apple growers of New England during the past season, were made out in Boston from telegrams which were sent from the Washington office and contained advices from fifteen or twenty of the principal markets throughout the country.

THURSDAY AFTERNOON.

THE BOYS' AND GIRLS' MAPLE SUGAR CLUBS AS DEVELOPED BY THE LYNDON HOME PROJECT CLUB OF LYNDON INSTITUTE.

MRS. JOHN B. CHASE, LYNDON, VT.

I am glad of the opportunity to come here to talk to you, but wish to say that, in inviting me here, Mr. Carleton has called upon one who knows but little about the maple sugar industry. My reason for being here, however, I will attempt to explain.

We have in Lyndon, a boys' and girls' club, known as the "Lyndon Boys' and Girls' Home Project Club". Many such clubs are located all over Vermont and the United States. These clubs aim to teach environment. They are trying to assist in the relation of school and home work, in order that boys and girls wherever they may be, may find life profitable and happy, and that they may, by making the most of every nearby opportunity, be better prepared to meet conditions of life in whatever place they may locate for life.

The Lyndon Club work is now done in connection with Lyndon Institute a secondary school, serving the purpose of a local and neighboring town high school. Speaking of the relation of school lessons to home work, the principal of this school recently told us of a boy who is taking the commercial course, selecting that course in order that it might assist him in his home poultry problems. This institution sympathizes with the effort being made thru the Club work, begun with children 5 to 6 years of age, the principal of the school assisting by advice with many of the Club plans. It serves as an elementary Extension department of that Institution. It is hoped that in time, thru this relation, when the boys and girls arrive at high school age, that thru their early training in home activities, helped out by the Extension teacher, they will have mastered elementary forms and be ready for scientific presentation of those subjects.

Another helpful agent to the Boys' and Girls' Club work in Lyndon is the Vail School of Agriculture. That school is teaching an appreciation of the land and the many oppor-

tunities that we have right here at hand waiting to be developed.

FINANCIAL SUPPORT.

The Home Project Club is financed as we think it ought to be,—by the cooperation of people from all over the town. The Club has never begged or passed any subscription paper of any kind. The results of the work have commended it to the public, and many contributions from ten cents to even thirty-five dollars, have been given. The expenses for 1916, including the salary of the Extension teacher, were about 1,000. Of this, the teacher's salary was paid by Lyndon Institute, and the public paid the remainder. While the expenses of the year were about \$1,000 the accounts of the boys and girls showed that they had increased the production of the town between \$4,000 and \$5,000. One of the most valuable results of the work is, that thru it, the children are taught to keep accurate accounts. They begin with some tiny record or story and by the time they are eight years old we can give them a little record book in which they can, with home and school assistance, note down what they have bought, how much time they have worked, etc. A small account book is made for each project carried on by the Club, and for which each child will pay cost price of a few pennies. The Extension teacher asks parents and school teachers to guide the children in daily keeping of accurate records, and she examines them as frequently as possible herself. They are turned over to her at the close of the season. Here are some remarkable accounts kept by a lad of eight years, showing his records kept in his maple sugar project. They seem difficult, but are really easy and fun, when presented in forms suited to the age and capabilities of the child. One child in 1916 cleared 60c, and a big boy banked \$100. Untold is the value of the work beyond the financial value. We mention health and happiness, a State being built up, the good blood of our ancestry coming into its own again. Before leaving the economic value of the Club work, I want to refer to a letter recently received from a Massachusetts educator who wished for accurate figures for one year of our savings bank accounts. We replied that we were not trying specially to encourage the banking of money, but rather, how to use it, and what its real value is. We discovered several years ago that the Penny Savings system seemed to bring out an innate love of money, rather than the proper use of money. Most of us seem to grow up, in spite of ourselves, more or less money worshippers. For

instance, if some one asks me for 50c or a cake for some public supper, my first inclination is to make the cake, altho I know that it will cost me more than 50c. Trying to guide the children in the investment of their money, after it is earned, is quite as important as earning it, and brings up many interesting experiences. This is one recent experience. One small boy had realized a few dollars from his summer's work, but not quite enough to buy a thorough bred calf which belonged to his father, and which he very much wanted. He couldn't wait to put the money in the bank and let it draw interest, so, how could he increase the money to the required amount? He had some ducks, and he finally, by disposing of these, made out the required amount, came into possession of the calf, and had developed thinking abilities and put his money to good use. Another boy, however, who wanted to go to Lyndon Institute, has during three years' Club work, banked several hundred dollars for that purpose.

VEGETABLE GARDENING AND THE MAPLE PRODUCTS.

When we begin our vegetable gardens, we look a long way ahead. As soon as the fall harvest is over, while the past season's experiences are freshly in mind, we put our garden plans for next year, on paper. In January, seeds are purchased, and a lesson given every week in all the elementary schools on vegetables. If land at home is not available, some that can be rented is procured. Four years ago in March, we began to realize that something stopped our garden plans—we could get only a fraction of the children's minds. Something was in the atmosphere that interested them more—an earlier crop than the vegetable crop—and we said, "Are we claiming to teach environment and then for five years been trying to promote vegetable growing in maple sugar time?" We began, with this query, in 1913, a survey of the Maple industry in our town, and added to our list of projects that already included: 1. Garden and Canning. 2. Live Stock. 3. Poultry. 4. Forestry. 5. Handicraft. 6. Sewing. 7. Cooking. 8. Dooryard Improvement. 9. Butter and Cheese. 10. Accounting. 11. Special Crops, the Maple Sugar Project. We offered prizes of 50, 35 and 25c, for the best exhibits of maple products made by any boy or girl in our town, to be exhibited at our Fall Fair. Nine boys and girls came with exhibits that first year. It was a small display, but was a beginning, and many people who came to the Fair said, "Why of course we ought to encourage maple sugar". With

this result of our first maple sugar effort, we got busy in the winter months, collecting literature on this industry, mostly bulletins, clippings, recent legislation, etc. We were, in our survey of the towns, amazed to learn how many orchards were for various reasons standing idle. About this time we were much encouraged by a man of excellent judgment in an adjoining town, who wrote us that he had learned of our effort, and wondered if he could not, thru our boys and girls, reach some of the farmers, and encourage them to make better products. We were not on a good business basis, but thru the kindness of this man, we were supplied with prizes for our second year's work, also, thermometers, pans for boiling in small quantities, and scales. So when some boy or girl was ready to back out, for lack of equipment, we were able to supply at cost, or loan, all that was required. he had between 30 and 40 boys and girls this second year who entered the "Hard Sugar Contest". They were supplied with record cards and demonstrated the amount of shrinkage between 240° and 260° F., weighing accurately every two degrees. These exhibits were very attractively displayed at the close of the second year's work, and a spirit of interest had been created among the grown-ups many of whom had begun to think about buying better equipment for their camps. When we began on the third season, we were on a good footing. In the eleven rural schools we were given time for one lesson each week. Teachers used maple bulletins for reading lessons, while drawing, composition, arithmetic, history lessons, etc., were related to the subject, and our prize lists were distributed thru the schools. The Agricultural School assisted by loaning us one of their men, Harold Carleton, son of the president of your association, who went with the Extension teacher to all the rural schools. He understood the practical part of the industry thoroughly, and gave a clear, detailed description, step by step, of the making of maple sugar. When the play element is taken out of living, life is dull, and when school work is hard and beyond the realms of the child's comprehension, it makes school a dull place. But when information on some subject of their experience is presented, in an attractive form, the children's minds will be found all there. Long before the first sap began to run, their enthusiasm was aroused, and information supplied, so that they were all ready for work. We decided that year, to work for fancy products, as well as for hard sugar, and we wish to express our appreciation to the President of the Vermont Maple Sugar Makers' Ass'n for encouraging us in this attempt.

Why not have a Maple Festival at the close of the maple season, instead of waiting until the Fall Fair?" was a question that presented itself to us before the season began, and this we decided to do. Speakers were engaged, including 3-minute talks by the boys and girls, a talk by Prof. E. L. Ingalls, of Burlington, State leader of Boys' and Girls' Club work, O. H. Benson, of Washington, National leader of Boys' and Girls' Club work, and A. A. Carleton, President of the Vermont Maple Sugar Makers' Ass'n. The State Forester, Austin F. Hawes, assisted us by sending a large exhibit and thousands of white pine seedlings and six kinds of evergreens in bunches, that were sold at cost, to the children. We had, in our teaching, treated the Maple Sugar work as a part of the Forestry project, encouraging the conservation, not only of maple, but other trees as well. C. O. Ormsbee of Montpelier, thru tree work in our town in past years, had been of much help in encouraging us to preserve and also set out new trees, and so in various ways, the boys and girls are becoming real "Foresters", realizing that it is the great variety of interests in Vermont that makes life here so fascinating.

In connection with the Maple Festival, one question arose, as it has with all our projects, shall we have adult work exhibited, with the boys' and girls' work? If you want your boy to be like George Washington, you will show him a picture of George Washington. If you want him to know good maple products, adult standards must be shown him. The Vermont Maple Sugar Makers Ass'n have helped us by giving us samples of standard grades, which are displayed in all the schools.

The average age of the boys and girls in the Maple Sugar project was 13 years. One hundred and fifty booked up for the contest, one hundred and thirty put their work thru to a successful finish, and ninety-eight exhibited at the Festival. The Maple Grove Candies, made by Miss Gray of St. Johnsbury, over 60 varieties, were most artistically displayed at the Festival, also the Monarch candies of Newport. Some one said before the Festival, "We won't have any commercial exhibits displayed, will we?" We did want the commercial side displayed, as much as space would permit, J. C. Eaton & Co., the Monarch Evaporator Co., and the Grimm Co., each had small exhibits, and created much interest among the farmers, and we have learned of several orders being placed for better equipment as a result.

The largest amount of sugar made last year by one of our Club members, a boy of 19 assisted by 2 brothers,

was three tons. One small lad made three cakes. Trees that would have otherwise remained idle, were rented for village boys. One mother said, "I cannot tell you how grateful I am for having my boy's spare time taken up in this way." A good many families, who have had a struggle to meet living conditions in the villages have moved onto farms in our vicinity the past few years. We have frequently heard the voluntary expression, "If we are going to get a farm, let us find one with a maple orchard."

An old orchard, near our village, which had been pastured for years, the new growth being destroyed, has for the past few years been protected, and the new growth is developing rapidly. Sixty trees in this orchard were procured for two village boys, and two village girls. Work of this kind we hope will prevent the devastation of our maple orchards, altho one of our neighbors has told us that at the rate the orchards are being cut, and going by, he anticipates that the industry will be a thing of the past in our section in the next ten years. One of our Club boys, whose father recently bought a farm, said one day, "I wish father had bought a farm with a maple orchard, there isn't a maple tree left on our place. Mr. Blank, just before he sold it to us, cut the whole orchard, and even the maples along the highway". That orchard had been known as one of the best in our section, but the trees are past recall, and the vandal gone from town with the money they represented in his pocket.

In this Maple Sugar project with the boys and girls, we do not wish to be alone. We hope to see the same effort put forth wherever the sugar maple exists, that they may be preserved for the boys and girls, and we believe that this industry may have a tremendous future in Vermont, if we will but make a cooperative effort now.

The National Dairy Show, and North Eastern States Exposition coming to New England last year, was significant of the fact, that we have a brighter future before us, promising development of our resources, especially in agriculture, and the possibility of more of our boys and girls being able to remain at home. At this Exposition the Lyndon Home Project Club had a special exhibit of maple products. I do not think that in the Boys' and Girls' building, where exhibits of products produced by boys and girls from nine states were displayed, that there was any one thing attracting more attention than did the Maple Exhibit. Other expositions of this kind are coming to New England again. We hope we may attend the National Market Gardeners' Association meeting to be held this fall

in Springfield, and that the boys and girls may be allowed space to exhibit their garden products. We are generally woefully deficient in Vermont, in the proper grading, marketing, etc., of fruits, and vegetables. We are hoping to have the boys and girls learn these things while they are young.

We do not believe in talking too much about what "we are going to do". Boys and girls learn all too quickly, if encouraged, to live in "future talk", in order to avoid the "doing of things today". The best history is that which we make today. However, with your permission, I wish to outline what we hope to do this coming spring, and we want the cooperation of your association. The Extension teacher will, beginning the last of February, give lessons in all the schools in town (about 600 children) and be ready, when the season opens, to visit the homes, to assist with fancy products and marketing of the same. We have also started for this season a "Demonstration Camp", about half way between two of our villages. There are 1200 available trees in the orchard. The equipment is entirely new, altho the camp is an old one. This camp will be supervised by a practical sugar maker, boys of the Project Club doing all the work. The boys will take the product to the syrup stage, when girls will turn the product into maple cakes and wafers, at the Lyndon Institute kitchen. The market for this product, two of our large eastern colleges, has already been secured, and if we have a call, as we hope, for more than the Demonstration Camp can produce, we will market for any of the Home Project Club boys and girls who have their products up to standard. We learned at the National Dairy Show, where the daily attendance was from 20,000 to 50,000 people, that the interest in maple sugar was national. Our exhibit there was so attractive that by the end of the second day, there wasn't much left. What could we do? It was against the rules to sell anything there, but when we explained to the association, they said, "If it is a case of sell or have stolen, sell". A telegram to Vermont soon brought us large shipments, which disappeared so rapidly that we were soon again without. The government representatives in charge of the Boys' and Girls' Building, said, "The people want to hear about this Maple Sugar industry, can't you demonstrate how the boys and girls are taught to make the fancy products?" Twice daily, for a week, talks were given and demonstrations of turning maple syrup into cakes and cream. Many people left their names to have products sent them in the spring, and many people who were there

have written us since we came home. The publisher of the Western Confectioner's Magazine of Seattle, Wash., pertaining to the candy business of the Pacific coast and Rocky Mountain States, said that he would be glad to advertise our products in those states in return for an article on the Vermont Maple Sugar Industry.

We have seen, thru some one project, like the Maple Sugar project, a child's interest awakened, growing to include a live interest in everything about him. A recent supervisor of schools in our district said, "The increased mental activity in the minds of the children of the schools where this practical training is given, is almost beyond belief." We want our boys and girls to cooperate with, and be a part of your organization. We believe that we could do great things for Vermont if we could have organizations similar to the Hampden County League in Massachusetts. Their organization begins with the Boys' and Girls' Club work, includes the County Agent, business men, etc. I believe that they increased the crops and farm values in that county, \$1,201,000 in 2½ years time, but such things are not possible without good organization.

When in Montpelier yesterday, talking at the Woman's Club about "Home Gardens", one woman said, "Why, don't you get tired talking about this work with boys and girls?" Like any other undertaking, this work is not tiresome when well organized, and it certainly seems to be our duty if we expect our country to maintain itself, to proceed without delay to better organization. It is fatal to delay the interesting of boys and girls in their future activities until their habits of mind are formed. When at five or six years of age, their interest in a maple tree, one hill of potatoes, etc., is aroused, the next year, by a little further encouragement, a growing interest will be found, and by the end of a third season, according to our experience, they are usually working independently. Girls and boys don't want to be treated like babies. They love to feel grown-up and bolster themselves up, and learn to work independently. They want to think for themselves, after being started, and learn by their own experiences, with an occasional boost over hard spots. This Club work, therefore, is not a burden to town, state or nation, as the boys and girls will carry it on largely after the first start. We believe that it is the most valuable feature of our educational system today, this training for Real Life, and that by special emphasis being laid upon it, we will see in a few years, many of our perplexing problems, happily disposed of. We have for a slogan, not "Back to the Farm", but "Stay on the Farm".

We believe that respect for these farm homes should be taught, and we hope that the standards of these same homes may be so high, that they may serve as the brightest educational factors in the training of the boys and girls. We are wondering, when recently so much military training is being agitated for the public schools, in order that "promptness and respect" may be taught, why the homes themselves do not teach these first principles of life. We must not have all of our good roads leading to "Rome", but good roads leading out to all of our small communities, and small homes, where we may have our own food stuffs being produced to meet our rapidly growing needs. A Californian said encouragingly to us the other day, "The outside world's opinion concerning Vermonters is rapidly changing, while you are considered conservative, yet the idea that many of your people are much like the Mountain Whites is gone by." We replied that we were glad, if, by being conservative, we had been able to maintain some of the desirable spirit of our ancestors, and that our hill-sides were still peopled with some of the good old Vermont stock, and that we were also thankful that many of our maple orchards were still standing, altho some of the maple veneer men had almost stripped some of the towns.

We wish to ask your association to cooperate with us and to assist us, by supplying our schools with samples of standard grade products, bulletins, or any literature possible pertaining to the subject. We would like to use the label of your association, adding the name of our individual club to it, as well as the National Boys' and Girls' Club emblem, the four leaf clover, signifying the equal development of Head, Hand, Heart, and Health. When we hold our April Festival, if some of you people could visit us, encourage us with talks or exhibits, it would be a fine inspiration to us, and if your president is there with some of the Association membership blanks, we feel that you would receive many new members.

If any of you people wish to start a Boys' and Girls' Maple Sugar Club in your home town, and wish to send the person who will have it in charge to Lyndon, we will be able to show him much more of the way the work is carried on than I can tell you. We also extend a cordial invitation to you all to visit our camp and the Lyndon Institute where we expect to turn the syrup into fancy products.

BENEFITS OF ORGANIZATION FOR FARMERS.

HORACE W. TINKHAM, COMMISSIONER OF AGRICULTURAL
INQUIRY, WARREN, R. I.

Mr. President, Ladies and Friends:

Any man who has to follow the constructive talk that you have just heard, needs friends. There is not any possibility of a grown man interesting grown men as a woman can interest grown men about children's work. If I could have the last speaker's enthusiasm, executive ability and brains you would sit up and listen to me, but I have not.

I don't know anything about maple sugar; I never saw maple sugar made, I never saw a maple tree tapped, and never saw real maple syrup until I came here this afternoon. We have bought it by the gallon, but never have known what real maple syrup was until we came here. And another funny thing, since I have been connected with the Eastern States Association I have been in a great many cities, and I have never seen any maple syrup that was not called "Vermont Maple Syrup". I have never seen any maple sugar that was not called "Vermont Maple Sugar". I asked one of your officers what proportion of the maple syrup made was made in Vermont, and he said ten or fifteen percent. Something is wrong. Either you make ninety percent or some one is trading on your poor judgment and lack of business ability. What are you going to do about it? Can we put up a little prize to you and get a whole lot done? I don't believe we can. You have got past the prize age. We really have got to begin with the boys and girls. If everybody in this country wants to put Vermont maple sugar and syrup on their advertisements it is certainly time that you sat up and made Vermont maple syrup THE syrup.

I do know something about it as to selling and organizing for selling. I know that your individuality is a splendid thing in itself and the very essence of individuality is here in Vermont, because you have got a jaw cut square across and you paddle your own canoe, but individuality will never build up a Vermont business, or make your State of Vermont label of real use to the people of the whole state.

I hate to talk combination, with such an exhibit as that here, knowing perfectly well that the individuals who made that possible is what made Vermont possible, and yet that is not all of the story. If those men don't have to lose by combination, I will bet those are the first ones that will put their shoulders to the wheel, and the last ones will be those that will make the maple syrup I have always bought, that is seven or eight times darker than that. You have got to put it in shape to sell, and merchandise it. I am a farmer and nothing but a farmer. Eight or nine years ago there was a bunch of farmers in the State of Rhode Island who couldn't get within a mile and a half of the prices they thought they deserved. We were like you fellows, but couldn't get the price for the goods. We got together,—we did have a little bit of faith in our own ability to work,—and did we back that faith with a large amount of money? No, just backed it with our faith in human nature and a little bit of business snap. That was all we had to back it with because we were farmers and didn't have the capital. What did we do? We simply organized. We own property to-day that is taxed for more than \$75,000 and not a single cent has been paid in as capital, but as dues.

The first thing we learned was that the big fellows amongst us found out, first, that we couldn't pack our own stuff any more than you can pack your own syrup and put up your own sugar. You cannot do it, not one of you. My very life depends on one or two specialty crops. We will take peaches. I am a little bit of a crank on peaches. You Vermont folks don't know what a peach is. You get the things that have been picked five or six days, green, sent up here, and you pay good money for them, and say, "Weren't those peaches good?" The skin sticks to them like a mortgage on a farm. When we pick our peaches we mean to pick them ripe enough so the skin will peel off easily, and we pack them to be sold the next day. Now I have had some boys from the Agricultural school to help me pack. This year there was a small crop. I was to get \$2.50 for what we call a half bushel basket. What did I find myself doing? You know, every one of you know. Prices were awful high and the peaches were awful scarce. I was putting in some seconds, and every one of you do it. You cannot help it, and I believe my moral backbone is just as good as yours. I told the boy that had been with me longest,—“You have been here three years, you know what my standard is, are you following it?” He said, “Well, no, sir, not quite.” I said, “You do all the rest of the

packing, and do it right, I cannot trust myself." We have to hire men that are experts and pay men that are experts to standardize and see that our work is carried out right.

Your Association has been in existence twenty-four years. You have done splendidly. Have you done any constructive work? Not a particle. You have done educational work. All well and good. You have done the work that my very efficient friend who has just spoken is doing a great deal better because she is beginning with younger people, but you have got to begin and make that ninety percent of syrup that is sold for Vermont Maple Syrup, or stop the other fellow from calling his Vermont Syrup, and you have got to standardize it, or you have got to join the procession of those who are letting their maple trees go into good lumber. You have got to pick your Association up and put it on its feet as a mercantile business. You have got to remember that every one of you who are farmers, are farmers, and can't be merchants. On our place we tried to make a merchant of a boy who was a farmer, and it was no go. We took another fellow and tried to make a merchant of him, and he made a dandy, but he didn't know anything about farming. You cannot take a man whose mind and training are for production and make him into a good merchant. Your manufacturers in Vermont have one head that does the manufacturing, and an entirely different one that does the selling, as farmers you must do the same. How are you going to do it? I will just give you a little illustration. Two or three weeks ago I wanted to help the price of high living, to help it for the farmers. We have a poultry association in Rhode Island. There is nothing surer than that we are going to get twenty cents a dozen next March for our eggs. Eggs to-day are seventy-five cents a dozen, and please the Lord ninety-nine percent of those were grown in the west or Canada. They are storage eggs. Why don't we start something to counteract that? Because we are not pulling together any more than you are on the Vermont maple sugar, but we go to this poultry association and say, "How many cases of eggs will you be producing next April?" "We ought to be getting 200 or 300 cases a day and getting twenty cents a dozen for them next April." Same old story. In April somebody is buying those eggs at twenty cents a dozen and they are not going into consumption in any such quantity as they are produced. Some one is putting them into cold storage and taking them out in December at seventy-five cents a dozen as Rhode Island eggs, which they are possibly,

but the producer sold them for twenty cents. Please see how you can play the game if you will pull together.

We go to one of the big banks and say, supposing we put 200 cases of eggs a day into cold storage, what percentage of the then market price will you lend us on the cold storage receipts? They say, "if you were a merchant and were doing that as a business we would be glad to accommodate you, you could have eighty-five or ninety percent, but you are not merchants, you are farmers." Did they want to do it for us? No, but if we combine and hire a merchant to manage for us, they will then do it. I think your banks in Vermont will realize that sugar when properly put up and properly inspected by persons not interested, is a perfectly good thing to advance money on when put into store houses to wait until the demand comes in the late summer. I imagine that most of you sell your maple sugar and syrup pretty soon after it is made. I should be surprised if it was not all sold by May, and I know that none of us ever think of having griddle cakes until November. There must be a considerable advance in price there that you can get just as well, collectively, by a series of little ware-houses in this state. There must be plenty of banks that will loan on that so that you can have your cake and eat it too. By warehousing your eggs in April you can get sixteen or seventeen cents a dozen, instead of twenty, and then can get twenty cents a dozen more when you sell them in November. At least the egg merchants do, and I can see no reason why maple sugar could not do as well if you could only combine and hire a merchant. It will help you fellows that have a high standard, to have it all standardized because every gallon of poor stuff that is sold for Vermont maple syrup, with the Vermont label on it, detracts from the price of the high quality every-time. Standardize your quantities you must, and to do that you must combine. We aim to get the top price for the best things in our association, and a poor price for poor things, but we find it fatal to mix our standards. You can have three or four storage centers here in Vermont. You can have men there to whom you pay a salary, but don't talk about commission, talk about salary. One co-operative association that I am connected with pays a manager \$12,000. Let me hit Vermont here, just to illustrate, on cheese. I was not a very young man when St. Albans was known all around as the cheese center. I have not heard anything about St. Albans cheese for a long time. Sixty-two percent of the cheese of this country to-day is made in two counties in Wisconsin. Farmers in those two counties were once

receiving \$2.50 a hundred pounds for their milk. That was so far under the skin that they were not even doing janitor work for their cows. This last year the farmers of those two counties, up to December 1st, received, if I remember rightly, \$4.68 a hundred pounds for their milk. I would rather get four dollars a hundred pounds there than six dollars a hundred here. Several years ago they started a co-operative selling agency for several co-operative cheese factories. A dozen of them got together and they hired a manager who knew his business. Those farmers said, "Now what can we hire you for, for a year?" He said, "I want \$3,500." You know just how you fellows would kind of lean up against it when you heard that salary. "No, sir," they said, "we will give one-eighth of a cent a pound." The manager said, "That is a trade, we will make it five years." At the end of the first year never mind what he got. When the first year had merged into the second and that cheese was beginning to float around the country, and they saw that the one eighth of a cent a pound would mean much more than the \$3,500 the manager first asked, indeed, would last year amount to more than \$16,000, they, being farmers, refused to renew the trade, and thereby again proved themselves poor merchants. That manager said he would compromise on \$5,000 a year instead of the \$16,000 they would have to pay on a commission basis. Don't forget that a good salary is the cheapest money you can spend for a good manager, when you think this maple sugar proposition over. You sugar people have got your own row to hoe, your own sap to boil, and before you get through, if you are going to carry on this work here and make a large business of it you have got to have it merchandised and advertised properly. Every middleman that is putting your goods out is getting double what you are, or more but he is getting paid for it, because he is using his brains in merchandising. He is getting two or three times as much; but he is putting in five or six times the brain.

You have got to have trade marks for qualities, and qualities for trade marks that cannot be monkeyed with by the producer. If such maple syrup as that on the table before me was put in some of the hotels in New York and was properly advertised,—a two-ounce jar of it on a plate of wheat cakes that they charge a dollar for,—it would be the style, and when Vermont maple syrup, put up properly and merchandized properly, becomes the style, I would like to own a good maple sugar orchard here and have the boys that you will turn out making that maple syrup. It will

be of a much superior quality, and that quality standardized by experts and guarded by your State of Vermont trade mark—and then merchandised by cooperative effort. Get busy.

I could talk all day, but when you get just at that point I have not another thing to say. If you don't see the point from what I have said now, either you or I have failed. I thank you very much indeed. (Applause).

PRESIDENT CARLETON: As we are trying to do our work here so as to omit tomorrow night's session we will have one more speaker tonight and make our session a little longer. As Mr. Spear says his address is not very long, and there seems to be a good audience here, I think this is a grand good time to hear him. Mr. Spear has been with us so many years that he needs no introduction whatever. Mr. Spear.

**THE UNUSUAL CONDITIONS IN THE MAPLE PRODUCTS
TRADE AT THE PRESENT, AND PROSPECTS FOR
NEXT SEASON.**

HON. V. I. SPEAR, RANDOLPH, VT.

Mr. President and Members of the Association:

I will agree not to exceed, very much, the fifteen minutes that I assured the president would cover what I had to say, because the subject that has been assigned to me is not a subject that covers a very wide field, but it is a subject that is mighty important to sugar makers of Vermont from two or three standpoints.

The unusual conditions spoken of, in the maple sugar market to-day, are due to two or three things which all concentrate in one phrase: Scarcity of the goods. We have never known the time when there was so small a supply of available stock of maple sugar and syrup in the country, not only Vermont, but everywhere, as there is at the present time, and we have three months yet before we will have any new goods.

This has come about by a peculiar combination of the seasons,—poor crops. In 1915 there was about 60% of Vermont's normal crop of maple sugar, a fairly good quality, and when we got together a year ago now and took an account of stock we were not quite as short as we are to-day, but it was used up very close, and before the new syrup came our markets were bare. We were expecting a good crop, after a poor one, and the result was we got last spring another crop of about 60% of an average crop, which means around $1\frac{1}{2}$ pounds of maple sugar to a tree. The condition in Vermont was practically the condition in New York, Canada and Ohio. Their crop was almost a complete failure. As far as good quality was concerned, I was told by dealers there that they didn't know of a gallon of good syrup that had been made in Ohio last year.

We can imagine what effect that has had on the demand for maple goods the past year, and we have had unusual prices for the goods as a matter of course,—couldn't help it.

Now the farmers or dealers, or both, could easily make a mistake for the coming season. Maple sugar makers are

all expecting or hoping that the present high prices are going to rule through next season. It is not quite reasonable to expect that, because if we have fairly good crops throughout the maple sugar producing area it won't be possible to market it at the prices we are getting to-day. At the same time it will be possible to handle a pretty fair sized crop, rather a large crop, at good prices. I don't know just what that will be, but it will be higher than the average. I wouldn't like, to-day, from what I know of market conditions, to make contracts for delivery of goods from next crop at the present time. If I was a producer instead of a handler of maple goods, I don't know as I would make contracts for selling my goods just now unless I got a pretty high price. It may not be worth as much as you expect, but you are going to come out all right this spring on either horn of the dilemma. If you get a tremendously good crop your price is going to be pretty good, and if you get a small crop your price is going to be high, and you are going to get returns if you have any crops at all. That is about the way the maple sugar situation sizes up to me, and I think it is pretty nearly correct.

I feel as though it was a time when people should take more than the usual amount of interest in this industry. I believe it will justify the maple sugar makers in getting a little further into the woods to get more trees and a larger production than they have had before. I believe the outlook justifies that, and that we will be able to secure a profit from this industry during the next year that will be very comfortable for the maple sugar maker. And I will add right here, from my observation and experience in the maple sugar industry, as I have looked around Vermont and known what is secured from our other efforts, that there is no part of farming industry to-day that is averaging as good a profit to the farmer as the maple sugar industry when it is properly conducted, and we are very foolish and we are very unmindful of our best interests when we don't undertake to produce the last pound that circumstances will permit. That is all I have to say. (Applause.)

Adjournment till the Evening Session.

THURSDAY EVENING.

PRESIDENT CARLETON: The first speaker for the evening is one that we let by on the forenoon program, and he will talk to us on "The Problem of Marketing Vermont's Maple Products." The gentleman who is to speak to us has had a good deal of experience on the marketing question, and although he is not a Vermont Yankee, yet we have adopted him and he is learning the Vermont tricks. Being acquainted with him somewhat from the connection which I had with him this last fall at Springfield, I feel sure that you will be highly entertained and receive something which is very interesting from his remarks. I take pleasure in introducing to you Mr. Mogens R. Tolstrup, State Marketing Agent, Department of the Commissioner of Agriculture, from St. Albans.

THE PROBLEM OF MARKETING VERMONT'S MAPLE PRODUCTS.

MOGENS R. TOLSTRUP, ST. ALBANS, VT.

Mr. President, Ladies and Gentlemen:

I can assure you I appreciate those kind words from Mr. Carleton. I know him and the rest of you do, so I need say nothing about him.

It is with considerable pleasure that I have accepted your invitation to speak here tonight. I will try to make you understand me, but I never make any apologies for being born in Denmark because it was not my fault.

It has been truly said "that he who makes two blades of grass grow where but one grew before, is a public benefactor"; let me add "That he who is able to use the two blades without waste is a money maker and a genius in the real sense of the word." Heretofore, we have expanded all our energies in producing that extra blade and do it cheaply; in many instances we have succeeded. But the trouble is that we have been so busy doing it that we have forgotten to make provision for the use and disposition of the additional production, so that in a great many instances the extra blade has been wasted and we are no further than we were before.

The charge has been made, that the American people are the most wasteful people on earth, and the charge is not altogether unjust either. It is pleasing therefore, to note the general interest which within the last few years has been created along the field of marketing. I want to congratulate you sugar makers because I notice from reports of former conventions that you have for a number of years had the subject of marketing up for discussion.

I wonder if many of you have ever stopped long enough to consider what a large task one has before him when he delves into the subject of marketing? Have you stopped to consider that in order to do successful marketing one must be conversant with the amount produced of that particular article? He must know about the manner in which it is produced, when and where, whether quality is good or poor, whether the cost is high or low, whether the competition in the field of production is very keen, whether the prospects for increasing production are very great. How, where, when and at what price the products can be disposed of, etc., etc. All those factors directly or indirectly influence marketing.

SCOPE OF INDUSTRY.

Let us pause for a moment to note the extent and scope of this industry. By a careful perusal of the U. S. census reports we find that in 1909 the latest obtainable—The whole U. S. tapped 18,899,553 trees on 87,537 farms, from which are obtained 4,106,000 gallons syrup and 14,060,000 lbs. sugar with a combined value of \$5,178,000, as against \$2,637,000 in 1899. Vermont in 1909 produced 7,726,817 lbs. sugar valued at \$720,927 and 409,953 gallons syrup valued at \$366,006 or a combined value of \$1,087,000 or an average price of little over 89c per gallon for syrup and a little over 9c per pound for sugar. Comparing with 1899 we have a 61.7% increase in production of sugar but only a 55.3% increase in price. For syrup we have an increase in production of 154.8% and in price 171.5%.

The 1914 Vermont State census gave a production of 6,311,943 lbs. sugar and 580,378 gallons of syrup, 5,508,656 trees were tapped, 4,061,914 trees were listed as available but not tapped. This shows that there is plenty of room for increasing the production within the State, providing the sugar bush receives proper care and attention, and the work is carried on in a business like way.

WHAT ARE MAPLE PRODUCTS?

While a few people may consider them a necessity, we should aside from its medicinal value, generally speaking, treat the maple products as a luxury. If this is not done we shall not be able to carry on a profitable industry—because it is easily possible to secure cheaper materials which will do fully as well when it comes to sweetening purposes. But when it comes to the exquisite and delicate flavor of the maple products, then we have to lift our hat to the real product in its unadulterated form. There is no substitute that will do quite as well, and it is here that we have a chance to stand out with a high class article and not only be able to ask a high price for it but also be able to get it.

We should be mindful of the fact that there are a lot of people with particular tastes, who are willing and able to pay if their interest or tastes are appealed properly to.

Having granted that maple products are a luxury it may be well to stop just a moment to consider what they are used for. Of course you will say they are used to eat; naturally so. This is granted but believe me if you go out in a new section to introduce, for the purpose of selling, any kind of a product you must be aware of the fact—that unless you have more definite information to offer about your products use, the home office will not be overloaded with orders. For this reason it is well to have pretty well in mind the purposes for what the product of the maple can be utilized.

Generally speaking it will take the place of any sweetening material—but as mentioned it is too expensive for that purpose alone. There are however a few places where we can make capital on a refined taste. Pancakes, for example, can be devoured to good satisfaction with cane syrup, sugar, preservatives, honey, bacon, sausage and what not, but there is nothing that will make quite as desirable a spread on father's pancakes—nor put him in a desirable mood as will the maple syrup, so ladies take notice. Neither is there anything that will please the youngsters quite as much as when they can have a maple sugar spread in good old fashion style. If you want to please the lady of the house it is difficult to do it in a better manner than to see that she has plenty of maple syrup, maple sugar and maple cream, because as we shall likely hear from Miss Thayer tomorrow, it is exceedingly desirable when it comes to making cakes, cookies, puddings, ice cream, candies and lots

of other dainty dishes which it is possible for the women to make and which the men delight in eating.

Again should you wish to please your best friends at home or abroad it is difficult to do it in a more pleasing manner than by sending them a box or more of the finest maple sugar or maple candy. You may wonder why I am mentioning those things just now, but the reason will be evident very shortly.

SHORT TIME FOR PRODUCTION LONG PERIOD FOR DISTRIBUTION.

In marketing of maple products it is well also to remember that the time of production is confined to anywhere from 2 to 4 weeks. This means that in order to do successful marketing we must be ready to grasp the sap while it flows. It should also be mentioned that while the producing time is short, the distributing time can be made so much longer. I call attention to this fact because so many people have the mistaken idea that unless the syrup and sugar is disposed of as soon as made, there is no chance for an outlet. This is wrong, because with our present knowledge of storing, our excellent means of distribution and our superior methods of advertising we can reach, so to speak, the people of the utmost corners of the earth in a very few minutes or at least in a comparatively short period.

Our market is the world, and the season the whole year.

WHO ARE THE BUYERS?

When it comes to marketing properly we find that there are in reality only two classes of buyers:

Class A. The large dealers which include those that can buy large quantities and store until people are ready to consume. They include:

1. Commission men, who either buy for direct distribution or to store until such prices as they think desirable are at hand. They seldom repack but buy any quantity, quality and in any shape package sent them.
2. Special or extra large dealers, who handle large quantities in their own stores but who are desirous of a high quality and who want to repack and apply their own label before the product is sold.
3. Tobacco firms, who use the maple syrup to soothe their more or less illustrious products in order to make

them in a degree attractive to the palate. They generally buy a poorer grade although there are exceptions.

4. Special firms who make a practice of mixing maple sugar or syrup with other syrup or sugar solutions and at times try to "pass it" for the real article although the pure food law has materially interfered with their business. Those belonging to that class generally speaking buy in large containers and do not cater to small packages. Ordinarily they buy at low prices.

Class B. This class includes those people who buy only for their own use, and who are anxious to get the products direct from the producers and from the same one each year. They are generally willing to pay fairly well for a good article. They have not always space for a whole year's supply. Those owning their own houses may have cellar space, but those living in the city flats have space only for a hand to mouth supply. Therefore, they are compelled to buy either direct in small quantities or also from retailers. Which of those is the more desirable? It depends on the service they get as the cost is about the same.

DEFECTS IN PRESENT METHODS OF MARKETING.

There are a few and general defects in the present methods of marketing maple products which I have run up against in my work and which must be overcome in order to make it an absolute success. The writer in the Century magazine was not so much wrong when he a few months ago termed New England as the National Wall Flower of America, while his assertion may not necessarily apply to us as sugarmakers I do believe we are to a certain degree a chip of the old block and might well take notice. Is it not true that we have been a little timid and have sat back in all modesty looking at the other fellow going ahead and reaping the profit or at least part of it, which by right ought to be ours? Modesty is a commendable virtue, to be sure, but it is somewhat comparable to the good children who say nothing and therefore escape notice and get nothing.

Some of the most notable defects as I see them are:

1. Lack of advertising or publicity.
2. Lack of standard products of uniform quality.
3. Lack of attractive and uniform packages.
4. Lack of promptness in answering inquiries and filling orders.

From time to time I have received inquiries from people in all walks of life asking where they could secure high grade, pure maple products, what they would cost? Where they were produced? How they were produced and when they were produced. People in general have very little idea about those things. While this may seem strange to a great many people here in Vermont, it is a fact nevertheless, and a fact with which we must reckon. You must remember that, while some of you will say, have we not distributed several thousand of the pamphlets "how Maple Sugar is made. Don't we have our maple sugar makers' association? Don't we have our maple sugar makers' label? Isn't the state aiding us in a little publicity?"

Most certainly all of this is true, but it doesn't go far enough. The pamphlets for instance are mostly distributed within the state and only within recent years. A few go outside of the state to prominent people, who buy as a result, but the great mass of the people don't know; you go out west of Iowa and how many know about Vermont maple products? Not an awful lot. They know about cane syrup, because it is advertised on every bill board.

The maple sugar makers' label is good but too few by far make use of it. Every Vermont maple sugar maker should use it and see that the goods come up to the requirements of the label. Then it would be effective.

Every package should be neat and attractive enough when sent out so people would notice it and as nearly as possible all alike, so people would take notice of it. Just note the effect of the "Gold Meadow Butter"; all packages are alike. Not so with the maple sugar. Note Hershey's Chocolate.

Again lots of trade is lost from inattention to correspondence. The commissioner's office receives complaints now and again because it has furnished names of producers to whom people might write for supply. But when they have written have been unable to get any reply for often as long as a month or more. That is not business. Neither is it business to refrain from filling an order for a month or so after it has been received unless some notice is given. Invariably it means loss of customers if those things are not heeded. Because if you do not fill the order somebody else will.

Another thing which should be mentioned is that at the present time we have to contend and compete with a very inferior dark colored maple sugar imported from Canada by the maple sugar blenders not to say adulterators, who pay as high as 14c per pound in Canada for that dark

sugar, which plus the 2 to 4c duty and transportation brings it up to about 20c a pound before it is ready to be sold. This kind of sugar, I am glad to say the Vermont sugar makers refuse to manufacture but which the Canadians admit they are foolish enough to produce. They say foolish because it hurts the maple sugar industry in general. The so-called blenders or adulterators refuse to buy anything else and are willing to pay high for it, because of its high color and consequent greater value for adulterative purposes. The Canadians contend that they would be in favor of seeing U. S. make a prohibitory law against shipping such sugar across the line.

WHAT CAN BE DONE TO REMEDY CONDITIONS?

It is difficult to state just exactly what should and could best be done in order to improve conditions, but there are at least a few things which if put into practice would improve conditions materially.

COOPERATION.

In the first place you sugar makers should co-operate. Some of you are perfectly able to get rid of all the products you can make at a very high price, and need no help, but there are a lot of others who are not, and in a way they are your competitors and why? Simply because they are not well enough informed and whenever somebody comes around to make them a visit and tells them that the supply is too great that there is no demand etc., etc., they get scared and sell for what they can get. Now if you had a local or better still a central cooperative organization you would have no trouble of that kind, because you would each individual send your products to that place get them graded and receive just what they were worth.

That co-operative organization should have a central store house, where the goods could be graded, repacked, stored and kept for distribution the year around.

Three purposes would be attained by this method:

1. It would be possible to standardize and grade the product, and consequently sell it for its real value.

2. It would be possible to make an all year market. This we should strive for because it is altogether folly to have the idea that maple sugar and syrup is good only at the season of production. As a matter of fact the time from October to March is the best season for its use. Only last week I tried to buy maple sugar and failed.

3. There would be no chance for the dealers to say I won't pay that much for syrup or sugar, because I can send a man out in the country to buy it for less money.

You might ask, well, how can this be done? The answer is very simple, hire a man who has the ability to handle such business and pay him a good salary, remembering that you can't get something for nothing. Take a small fraction of a percent of that million dollar industry and invest it in a store house and the manager's salary. Pay a certain price for the goods and let the surplus be paid out to the members as a dividend proportionally to the amount of sugar and syrup the individual had consigned. The details can easily be worked out. The Danes have a lot of similar organizations. The cheese manufacturers of Sheboygan, Wisconsin, are doing it with cheese. They had a little hard time for a year or two but that was all and it paid them to stand by their organization. It will pay you, too.

Another thing it would be well to have a census or survey of the yearly consumption and keep a slight record of how much it costs to produce the goods. This would help in advertising and also in estimating next year's production. It would also encourage the care, upkeep and protection of the sugar bush.

HAVE SUITABLE ADVERTISING, HOW?

Why not advertise a little more? Any other manufacturing firm spends a certain amount of money for advertising purposes and it pays. The sugar makers spend altogether too little.

MOVING PICTURE.

Why not have a moving picture film taken of the sugar making as it is actually carried on. Have it shown on the screen all over this country and the world. And I will venture that besides being a great educational feature it would be the most effective advertising you have ever gotten. Because if properly made those pictures could be made a great educational feature and show the difference between good and poor sugar, syrup, etc. Moreover, it would reach the consumers. It will cost something, but personally I should like to have a share in the investment. We must realize that things of that nature are coming. Think it over and get next to a moving film corporation.

A central organization cooperative in nature could

advertise in some of the better Journals. Why shouldn't maple products be as well known as some other products you have heard about. Let me mention a few names and see how many of you recognize ever having heard of them before: Charlie Chaplin, Mary Pickford, Gold Medal Butter, Pears Soap, "It floats," Ivory Soap. "There's a reason", Grapenuts, "Eventually why not now", Boston Garter, Mennens' Talcum Powder, Coca Cola, Moxie, De-Laval Separators, "It hasn't scratched yet", Bon Ami, "It chases dirt", Dutch Cleanser, etc., etc.

When maple products get as well known as those mentioned you can't begin to supply the demand.

HAVE YOUR OWN PUBLICATION.

Did you ever hear of an industry with as many members and with as much production, which did not have something of a publication as a medium through which to discuss their interests? Why not have a trade journal or a publication monthly, bi-weekly or weekly through which to discuss your problems. This publication could be used as advertising medium as well both for machinery and maple products. Such a publication going into the various parts of the country and the world would be an effective means of advertising. I merely give this as a suggestion.

HAVE COMMERCIAL EXHIBITS.

Still another good means of advertising is to have good commercial exhibits. That is work towards putting the goods up in just exactly the way they should be marketed. The display is excellent but the commercial side must not be overlooked.

GET MORE MEMBERS TO EXHIBIT.

Why not next year ask for a gallon of syrup or a couple of pounds of sugar or more from each man, pay for it, have it graded and scored, and afterward sell it. In that way you could get a real exhibit of several hundred or even thousand of gallons of syrup. It would create more interest and give you more members without any extra expense. Why not send the people a membership card in return for their gallon of syrup. It would increase your membership to what it ought to be. Every sugar maker a member, and every member a sugar maker, just think what you could do with 10,000 members.

You made a good start at the National Dairy Show and gave perhaps more advertisement to Vermont maple products than they have ever had before, but it wasn't enough, and if you have another chance I know you will do better still.

HOW CAN WE GET NEW CUSTOMERS?

Very briefly speaking new customers can be secured through the following channels:

National: Through writing Boards of Trade and Chambers of Commerce in various cities for names of leading wholesalers and retailers.

Educational Institutions, Faculties, Bankers, etc.

By writing old residents of your home town and asking them to furnish you a list of their acquaintances wherever they are.

Use attractive labels, with "Made in Vermont" on it. It is contagious and people will buy.

Foreign: For foreign customers write the American Consul in those countries for aid, he will give it.

In all those enterprises your trade journal would be of assistance as would your cooperative association because it could preserve and multiply the list, and shortly you would have more orders than you can take care of.

Lastly let me mention that one of the future ways of marketing maple products will be through maple cream and fancy candies. It is cheap at its present price compared to other things. But it is a profitable way of disposing of the maple products.

In conclusion let me state that the maple sugar industry while quite old is still in its infancy, that it has a bright future is quite evident when we look at the progress which has been made within the last few years. Furthermore, by applying business principles and expending a little extra energy we shall be able to attain even greater things and within a few years double the value of Vermont Maple products.

How are you going to treat the people? Do it exactly as the old lady told me when we had a very large picnic, and we asked her how we should make the sandwiches? She said, "Make them exactly as if you were going to eat them yourself." Deal with people in the way that you would like to be dealt with and you won't have any trouble. Give to the world the best that you have and the best will come back to you. I am very happy to have been here and thank you very kindly. (Applause.)

PRESIDENT CARLETON: Some one has said that New England was beautiful, and of course we take it that Vermont is one of the New England States; also that New Englanders didn't say anything. We are justified in not saying anything because our mothers have taught us, when we were children, that we should be seen and not heard, and perhaps we follow this out a little too strongly, but as an old gentlemen remarked, in regard to those who don't say anything, "They keep up a devil of a thinking."

Now if you have any questions that you would like to ask for the next five minutes we will have them. I think Mr. Tolstrup will answer any question that you would like to ask.

MR. PURRINGTON: Have you any figures on the expense of getting out a publication?

MR. TOLSTRUP: I used to work for a publication a little bit, but did not have anything to do with the financial end. At one place we had the American Co-operative Journal, and I had the pleasure of editing a department. We had 6,000 subscribers. We came out and could pay our editor two or three thousand dollars. We didn't charge more than a dollar a year subscription. That was monthly, and I know of several daily papers that charge only a dollar a year for some twenty or thirty pages, and the advertising will take care of itself.

MR. ORMSBEE: There was a moving picture film taken of sugar-making last spring and it is on exhibition now in New York.

PRESIDENT CARLETON: We are very sorry tonight that we were unable to secure a lantern to throw on the slides for Mr. Ingalls, but he has agreed to do the best he can under the circumstances and give us a talk along the line he was to lecture to us with his slides, "The Boys' and Girls' Club Work in Vermont." It gives me pleasure to introduce to you Mr. E. I. Ingalls, State Leader, University Extension Service, Burlington.

BOYS' AND GIRLS' CLUB WORK IN VERMONT.

E. L. INGALLS, STATE LEADER.

Mr. President and Members of the Vermont Maple Sugar Makers' Association:

You may raise the question, why should one interested in Boys' and Girls' Club Work be talking to the sugar makers of Vermont? I think there is a point of contact. The Boys' and Girls' Club Work is a definite part of the Extension Service work, organized on quite as definite a basis as the County Agent work for men, or the Home Economics department for women. It receives its support from both the State and Federal Governments, and is organized in every state in the Union.

As the name indicates, it concerns the activities of young people and is limited, primarily, as laid down in the law, to the young people who live in the country, for the Extension Service work is for the country folks. Any activity that the young people are interested in in their home life may be made the subject of Club work. We are somewhat restricted in our work owing to limited funds available to carry it on. Throughout the country at large, and also it happens in our own state, some ten different projects are taken up under the head of Club work.

We find, as we look the situation over, that nearly every Vermont home has a home garden. That means that boys and girls are interested in gardening. Closely connected with the garden project is the canning work. In our own activities we put the two together usually. Nearly all our homes have poultry of some kind. Here we have another activity that a majority of our Vermont boys and girls are concerned with. They do this work as a part of the home chores, but many of them have a poultry business of their own. Inside the house we find that a very large percent of our boys and girls have activities, practically all of the girls and a great many of the boys. We limit these activities usually to two things, the cooking and the sewing projects. Then there are field crops that engage the attention of many boys particularly, and some girls. That line we limit, for the most part to

corn and potatoes. We are developing a farm and home handicrafts project, the doing of things with the hands and the use of tools. This work is carried on by girls as well as boys.

There are certain livestock projects, and along this line we await developments. Although we are a dairy state, we do not find many at present who are carrying on a dairy project, but there are individuals in the work. This last year we had a pig-growing contest that took the attention of a considerable number of boys and girls who carried the work through according to the plans laid down, and to a successful finish. Prizes were offered for high grade of work done.

In a general way this covers the different projects that we have taken up in our own state. In the National work, outside Vermont, there are some lines of work that are not so easily adapted to the conditions here in Vermont, for example, the beef clubs in the West, and in the South there is interest in cotton and sugar cane, things we cannot think of here.

The word "Club" is used in connection with the work because in many parts of the country and for many years, where groups of boys and girls have been organized to carry on certain phases of work, the organized group has been denominated a "Club", and that name has seemed to stick for want of any better name. All of the young people engaged in what we call "Club Work" are not members of an organized group. In our own state the past year we had about 3,800 names on our mailing list in some ten different projects. A good many of them were members of our 152 organized groups in a somewhat less number of communities.

There are some advantages that come to young people who are organized that they cannot have if they work alone. There is a better chance to co-operate and to compete if they are associated in a club. The club can have meetings and definite programs that concern the work, which individuals alone cannot provide for. Many of the helps that we can give the club group we cannot give the individual because of lack of funds and time.

Why is the Extension Service interested in this work? For the same purposes that it is interested to carry on the work for the farmer through the County Farm Bureau, and for the women in the house through the Home Economics Department, to bring in the best methods that are available through demonstrations, to encourage young people to use these methods and to adopt the most business like measures

in everything they have to do. We go into a community, and if we find sufficient interest we make the organization. A part of the organization is what we term a "local leader", a person who will be in a degree, a head, and yet a supervisor and officer, to stand between the club group and the helps we try to give. There are so many ways in which this club person can be helpful! It needs a person interested in young people, some one they won't take advantage of. It needs a person with vision, with sympathy and patience. We don't always find the person, but it needs a person who can afford to give time to young people, to meet with them in club meetings, to hold their attention to the work in hand. Young people easily forget to do the necessary thing at the time when it most ought to be done. We need some one to help us arrange for local meetings and for demonstration work. If you are going into a community to meet with a club group there is quite a little work to be done to arrange for it. It gives us a point of contact if we have some one upon whom we can depend to make the necessary arrangements.

We have what we call a system of follow-up work. After the work has been laid out, organized and started, it must be followed up and finished, so we have printed data of an instructional nature and blanks on which to make reports from time to time through the season and at the end of the season. There are several things that we work for through these reports: One is that members do this work *in season* and *according to* the methods that we think best to be used. They keep a diary, so to speak, and from data thus collected they can make their reports to us. This lets us know how they are getting on and at what points they are successful and at what points they most need help. Then we can come in where they need the help and furnish it.

Another important thing is the accounting side, keeping an exact statement of all expenditures and receipts. They find out at the end of their club season, whether they have carried on the work at a profit or at a loss, and if it is a profit they know from what points that profit springs. If there is any loss at any point they know where that is, and when they try again they can remedy the defect. It has been a most interesting and encouraging thing to know that in the work last year, of the several hundred who completed their work, only one reported a net loss, and that was due to the season more than to any lack on the part of the boy.

There are certain agencies that co-operate with us, and this co-operation is quite necessary to the successful carrying on of the work,—for instance, organizations that already exist in different communities. We do our work quite largely through the public schools. Here is an avenue of approach where we can get at the largest number in the shortest time. We have permission to do this from the State Board of Education, from school boards, superintendents and others on the official side. Really for this work we have the open door of the school house of the state. Another important agency is the Grange, and if any agency is interested in this work and should come to its support, what one should it be if not the Grange? I have in mind particularly one town, but even there it was not the Grange alone. There were the school, the Grange and the people at large, and each one of these elected members of a steering committee to have charge of the work of the town. The Grange looked after the prizes that were to be given in money, and also put work into the exhibit at the end of the season. Other agencies are the Boards of Trade, Women's Clubs, Parent-Teachers' Associations, the Y. M. C. A. and others. I name first those that are very general, like the school and the Grange. In other towns we make use of the organizations we find there, instead of increasing the number of organizations.

Some of the things that we require of the boys and girls are that they must agree to *work* for certain things, else they don't qualify. They work for quantity and quality, and the Club members are marked on these things. Usually we mark them on a four or five point basis: On the quality, quantity, exhibit and story. Sometimes we put in a fifth one—profit. To produce a large yield isn't the only thing to work for, but to produce a good quality. A good deal of stress is laid upon the exhibit. It makes a chance for the young people to come together. We emphasize the local exhibit first of all to bring the exhibit near to those who are doing work, so that those who are interested in it may also attend the exhibit. You may have a city exhibit. It accommodates the young people in the city and a few in the outskirts, but get outside your town and most of the youngsters are not there! In some communities we find it convenient to have more than one exhibit because of the conformation of the town. In other cases two or three towns can come together, and oftentimes that is done under our school system. The supervisors unite and come together in the most convenient center. It brings different communities together and different schools to-

gether, and it brings their products together. We work to have the best results put up in the exhibit. Club members are encouraged to do this because of what it has to do in the added rating they will get in their work. Prizes may be awarded and this is an incentive to them to do their best. They learn by comparing notes, not only by learning from each other personally, but by studying the exhibits that each one brings in. Some one may think he has produced a fine result, but when he puts it up beside his neighbor's he finds that his neighbor has done better, and he begins to inquire why. He goes home to put into practice the reasons why. It interests and encourages the members to go ahead and try the thing again, determined to do better. Almost universally the boys and girls say, "I am going to try it again and do better."

After the exhibit then the story. The Club member, to complete his work, must write a story of his season's experience. In this he makes something of an historical sketch. He refers to the problems that he meets and overcomes, or fails to overcome, and tells of his most interesting experiences and results, of the exhibits and the prizes won, and the experiences that come to him throughout all the work.

There are a great many things that I could tell you about Club work and the experiences we have had in our own state. Club work is not new in Vermont. Mrs. Chase has told you of the maple sugar end of the work in Lyndon, but that is only a part of what they have been doing in Lyndon for ten years. Our work in Windsor County has covered nearly the same line, particularly in corn, potatoes and poultry. So we would find it in other sections of the state and in individual towns, if we were to go here and there.

I want to tell you just a little about two projects of the past year to show you how it works out, and how young people co-operate and how some agencies co-operate with us. I refer first to the pig-growing contest. About a year ago at the time of the annual meeting of the Vermont State Bankers' Association, they discussed the agricultural interests of the state, with the result that they appropriated a sum of \$100 to be used somehow in this work. A committee was appointed to take the matter in charge and it was decided that the money be used through the Club Work. With that definite thing in mind we drew up our pig-growing contest requirements. We made the time brief, covering a period of four months, and any boy or girl of ten to eighteen years could go into the contest. They were

to use a pig four to twelve weeks old and work for rate of gain, the cost of gain, that is at how small a cost per pound could they make the pig gain, the individuality of the pig, and then the story. On these four different points, on the scale of one hundred, the contest was to be decided. The work started. We thought if we should find fifty boys and girls who were interested we should be pleased. We had inquiries from 175. One hundred started the work and completed. Our county agents scored the animals. The money that was given us we divided up and assigned three prizes to each county, three dollars, two and one. That left \$16 which we put into three state-wide prizes, ten dollars, five and one.

We asked these young people to make a statement of the conditions under which they started and to make a report each month, and when the contest was completed to make a complete report. While there were 100 of these young people that did the work, only about 50% of them fulfilled all the conditions, so we were not able to award all the available prizes. We had entries from every county in the state, but in two counties no one qualified for the prize. Out of this leeway we recommended that certain special prizes be given to other people who had done exceptionally good work. The champion sweepstakes man of the state was Merle Carpenter of Colchester, who raised his pig from 33 pounds on the first day of May to 262 pounds on the first day of September. Reginald Mumley, of Northfield took the second prize, and George McAllister, of Hyde Park, the third prize. These 100 youngsters produced over 30,000 pounds of pork, valued at \$3,000. We know how much it cost them to produce it and market it because we have their figures.

A good many of these young people exhibited their pigs at local fairs and took prizes. The state champion sent his pig to the Chittenden County Fair at Essex Center and took first prize. Six sent their pigs to the National Dairy Show, Springfield, Mass., and four took prizes, a total of \$25.00. We got some to put in their story on "How I Raised My Pig." Five sent pig stories to Springfield, and every story brought back a prize. We are very proud of that.

The other thing I will speak of particularly is the National Dairy Show and its relation to Club work in Vermont. The Dairy Show covered ten days, one day was set aside in which especially to emphasize Club work interests. The state leaders in the ten Northeastern states drew up the program. It covered gardening, canning,

sewing, pig raising, cooking, corn, potatoes, poultry, handicrafts and dairy judging. Each state was privileged to send exhibits and a certain number of teams to judge and to demonstrate in all these projects. In the demonstrations, if it was a pig project, they would give some phase of pig work; if a poultry project, some phase of the poultry work. We had a dairy judging team, a poultry judging team, judging teams in canning and in handicrafts, and a potato judging team. For the most part the teams were made up of three members each. We sent down a total of six teams and two people extra—a total of twenty young people. They demonstrated in all ten different projects and they judged in five.

The expenses of these young people were paid and their entertainment taken care of. They were chosen because of the quality of work they had been doing. Our judging teams in poultry and in handicraft, each took second prize. Our team in potato judging took the fourth prize. In dairy judging they didn't judge as teams but as individuals. Two of the boys in the team won prizes, and one boy not in the team took a prize also, so of our four Vermont boys sent to judge dairy cattle three of them took prizes. In all the judging contests the prizes were cash prizes, except in the dairy judging those were animal prizes. There were eighteen animals available for prizes. Our Vermont boys took the third, fifth and eleventh prizes and their three animals collectively were valued at \$350.

In the demonstration work we sent a special team to give a special demonstration under the pig project. It was to "cut up a pig." Two boys and a girl comprised the team, and it was one of the most unique demonstrations of the whole exhibit. We entered exhibits in all of the different projects and we took our full share of prizes. Vermont was not the first state in either area or population, and yet, though competing with New York and Pennsylvania, as well as Rhode Island, we took a little over one-tenth of the money value of prizes, and a little more than our pro rata share of the animal prizes in judging dairy cattle.

The experience that came to these young people should not be lost sight of. I am glad to note in the letters that have come from the boys and girls that a great many of them rated the "experience" as the chief value of the trip,—the opportunity to see the National Dairy Show.

These are fair samples of the work we are trying to do in the other projects as well as in those I have mentioned. In all these activities we have tried to bring in a knowledge of the best known methods and demonstrate their uses.

It is an attempt to bring up the next generation to be a better race of home makers than we are ourselves, and we can do it *with your co-operation*. It is not a "Back to the Land" movement, or a "Stay on the Farm" movement. It is to show the boy and girl, while yet boy and girl, what opportunity there is right at hand, and to give each a chance to find out for himself what that opportunity has in it for him.

Another thing we must not lose sight of, is not only giving boys and girls our sympathy and encouragement, and co-operation, but giving them a share, an ownership, in the things they are doing. They are doing the gardening as a matter of course, but many of them would have, if you would say the word, a little business of their own. One of our boys in the poultry work is now a fine poultryman and is doing his work in a businesslike way. At the poultry exhibit in Barre recently he took some of the best prizes, and the newspapers classed him with a poultryman whose name is heralded throughout the state. He started in with the Corn Club, but when he struck poultry he seemed to strike his major line.

Were there time I might mention some of the achievements in yield, in bushels or in quantities, and the profits in dollars and cents that these young people have made through their Club work.

In the Pig Club reports we asked an answer to this question: What are you doing with your profit? One boy said, "Putting it all in the bank." Another said, "I have put most of the money into the bank. The rest I shall invest in the pig business next year." One of the girls said, "I have put it in the bank and I am going to add to it to pay towards my college education."

Not only the State Bankers' Association gave us money, but individual banks said, "What can we do to help?" In several places they made loans to young people. They said, "We will loan you five dollars and take your note. When the job is done and you get your money from the sale of your pig, pay your note." In one county the bank said, "We will give the first boy and girl to enroll in each town in this county, \$2.50." The young people are learning to write a note and keep check on it through the season, and pay it up in a businesslike way at the end of the season.

In conclusion I would say, the youngster is not afraid to make a mistake. In this, the boy and girl are not like the older folks. They are even willing to make a mistake and acknowledge it and correct it, and if we can offer a

better method in place of the one they are now using they will quickly and eagerly adopt it.

In talking at the New England Fruit Show, in November, I suggested that we of Vermont ought to add to our projects for our boys and girls an *Apple Club*. I say to you men and women who are the maple sugar makers of Vermont,—Vermont the great maple sugar state—we should add also a *Maple Sugar Club* for our boys and girls.

PRESIDENT CARLETON: I have a notice which was handed to me. There will be held in Springfield on the grounds of the Eastern States Association the largest exhibition of manufactured products of all kinds, of New England make, that ever was held. We expect a larger number of visitors than they had at the Dairy Show. Get busy then and learn something.

I thank you very much for the quiet way in which everything has been conducted in this room. You have done nicely. We will now adjourn until tomorrow morning.

FRIDAY MORNING.

H. B. CHAPIN, PRESIDING.

MR. CHAPIN: This loving cup which you see, and which was so kindly donated by the Welden National Bank to the Business and Professional Mens' Association of St. Albans for the Vermont Maple Sugar Makers' Association, is to be awarded to the most meritorious exposition of maple goods at this meeting as a sweepstakes prize, the winner to hold the same until the next meeting, and if won three times in succession, to become the property of the exhibitor.

It gives me great pleasure at this time to present this cup to Mr. J. P. Spear of West Newbury, as the winner for this year, and I trust we may see him on hand next season with a still more beautiful display of Vermont's famous maple products.

MR. CROFT: I would like at this time, if it is proper, to move a vote of thanks to the Business Mens' Association for the interest they have taken in bringing this meeting here. I know that you have an ideal Business Mens' Association here, and I admire their activity in the interests of our Association. I move a vote of thanks for the interest they have shown in this manner.

Motion seconded by Mr. Carleton, and carried.

MR. CARLETON: I thank you, for this Association, for what you have given us. It has been suggested by some

members that we would like to gather up at The Tavern for our dinner all at the same time, for a general farmers' dinner, and any of our friends among the sugar makers, or friends of the sugar makers, we would like to have take dinner with us. We will try and make the hour a pleasant one.

At this point adjournment was taken to another room for the remainder of the program.

PRESIDENT CARLETON IN THE CHAIR.

PRESIDENT CARLETON: We will now call our meeting to order. The first on our program this morning is an address by L. L. Story, of Fairfield, Vt., on "Maple Cream, a New Outlet for Maple Products". I wish to say in regard to this that of course among many of us sugar makers this is a new outlet for our product, and it is a worthy product. That I know because we handled a good quantity of it at Springfield, and the general public is immensely pleased with this product. I will speak a little more in regard to that this afternoon when I am supposed to give an address, but as I have been listening to other people I have decided to cut out most of that and give you a general talk, because some of my fire has been discharged before they allowed me to appear. Therefore, I take pleasure in introducing to you Mr. L. L. Story, one of our champion cream sugar manufacturers of the State of Vermont.

MAPLE CREAM, A NEW OUTLET FOR MAPLE PRODUCTS.

MR. L. L. STORY, FAIRFIELD, VT.

In venturing the statement that nearly all sugarmakers have made small quantities of maple cream, I am sure that the truth has not been varied from to any great extent. When "sugaring off", after the syrup has been boiled until it is nearly done or almost sugar, it is a common practice with many sugar makers to dip out a few small spoonfuls, with the object of testing its graining quality by stirring. If it was put in a cold dish, the sudden cooling would cause the sugar to become waxy very soon. Usually it would be stirred quite rapidly and as it began to "whiten out", the desire to see how light colored it could be made caused the stirring to be prolonged until the sugar had arrived at a soft putty like condition with a very smooth grain and light cream color.

This was maple cream, and had it been sealed in an airtight receptacle before it could dry out and harden, it would have retained this soft smooth texture for an indefinite length of time. In all probability, however, the maple cream was eaten on the spot and it was decided to cook the sugar a while longer so that it would "stir up" with a better grain and not be so "salvy". Perhaps it was remarked that maple sugar always tasted better when it was soft and salvy but it would not do to offer it for sale when in that condition.

In larger quantities, maple cream presents no difficulties in manufacture except the process of stirring. The cooking is easier than for maple sugar and the cooling or waxing is a simple matter but the stirring is more than a man's job. On a conservative estimate, it is ten times the labor to stir maple cream and get good results than to stir maple sugar for caking. It requires a specially constructed stirring machine to get the best results and accomplish a fair day's work. In an experimental way, I have stirred small quantities of maple cream with an egg beater, but with the development of the idea of selling maple sugar in this form, a stirring machine turned with a crank by hand was constructed. This machine stirred a satisfactory quality of maple cream but was hard to turn at the necessary high speed and was of insufficient capacity for a profitable

day's work while the man power required to turn it was more high priced than even gasoline. Under these conditions, it was vitally necessary to have a larger machine, run by power, to do this work, so a large capacity machine which will easily stir a thousand pounds in ten hours, run by an engine of not less than five horse power, was constructed and has done satisfactory service ever since.

While maple cream has been made and sold, more or less for several years, still it has never been credited with much of a share in the total maple sugar production though the quantity made and sold is increasing somewhat. The general public is as yet unacquainted with maple cream and the average person's first impression, on hearing the words "maple cream", is that it is some kind of cream candy flavored with maple sugar. The name is not inappropriate, however, as the cream color and soft body of this product has some semblance to well frozen ice cream. Oftentimes people who are more or less familiar with maple sugar are somewhat loth to believe that maple cream is pure maple sugar. Some imagine that it is a mixture of maple sugar and cows' cream, others think that it is mixed with white sugar because of the light color, while one person, I was told, said that she didn't believe there was one particle of maple sugar in it.

This maple product is, however, easy to sell at a fair price. It takes quite readily with people who are familiar with maple sugar, and is easily introduced to people who are not consumers of maple products. It sells well right here in Vermont where nearly every family lays in a year's supply of maple sugar or syrup during the sugar season or shortly afterwards. With people who are unfamiliar with maple products, maple cream is more acceptable than either maple sugar or syrup. I have been told that it is a rather difficult matter to interest people in either maple sugar or syrup unless they have lived in the maple producing territory or have acquired a taste for maple products. Many people say that for themselves, they had as soon have corn syrup as maple syrup and prefer cane sugar to maple. Considering the large population of the United States, the relatively small production of maple products in comparison to the total consumption of all kinds of sugar, the large proportion of maple sugar and syrup used in the manufacture of tobacco and candy, it is safe to say that only a minor proportion of the total population are direct consumers of maple products. Under these conditions it is a difficult matter to sell maple sugar or syrup in any considerable quantity at much more than ordinary prices in com-

petition with beet and cane sugar. This statement is borne out by the fact that the maple sugar producers of Vermont use many times as much cane and beet sugar as they do maple sugar and syrup.

Maple cream is not sold as a sugar although it is the purest of maple sugar. The novelty of the name, the sealed sanitary package, its soft smooth texture and fine maple flavor, together with the fact that it is ready to use for any purpose without much preparation are its best selling points and it frequently appeals to the non-users of maple products previously mentioned who do not possess the taste for maple sugar. The best way to sell maple cream is to call peoples' attention to the package and then let them eat some of the contents. The name "maple cream" and the descriptive matter on the label arouses their curiosity and the smooth melting flavor does the rest. It appeals mostly to a class of trade who can afford to pay for good things to eat and it has been my experience, so far, with what I have sold through dealers, that those who charge the highest prices for their goods and have the most expensive locations are the most successful in selling maple cream. It takes especially well with tourists and summer visitors who are always on the lookout for something new and good. People buy it to send away to their friends and this is one of the best kinds of advertising that this product can possibly have.

The main difficulty with the small producer selling maple cream is the lack of equipment to fill large orders promptly and satisfactorily. Sometimes in reaching out after new business, inquiries are received for quantities so large that an order of that size could not be filled in a reasonable length of time and to fill such orders would require quite an investment of capital in the plant and raw material.

There should be enough maple cream made so that a large share of the best trade the country over, can be supplied and the product become as well or better known than maple sugar. Many non-users of maple sugar can be induced by means of maple cream to acquire a taste for maple products and thereby add to the number of consumers.

Produced in large quantities and properly introduced, there is every reason to believe that a satisfactory market outlet and a more remunerative price can be secured for a large proportion of the fine quality Vermont maple syrup that is now sold to the big buyers and through the commission dealers in the cities. This would give the maple

industry of Vermont a boost all along the line and do much to increase the prestige of Vermont maple products.

L. L. STORY,

East Fairfield, Vt.

Dear Sir:—

We are just in receipt of your Pure Maple Cream, and would like to have you give us quotations on car, and less than carlot, f. o. b., your freight station, also amount of brokerage paid to brokers for selling these goods for you.

You will notice on our letter-head, we have representatives in different parts of the United States. If you are able to give us the right quotations, we no doubt will be able to place a car on the coast, which may be distributed from the car destination to the different localities near by.

The writer is an old Vermonter, and is fairly well posted in regard to maple sugar making. We are endeavoring to place ourselves in a position to enable all manufacturers and buyers to call on us for their maple sugar, and anything in the maple sugar line.

Be sure to state in your letter brokerage allowed to us. We sell manufacturers and jobbers only, and if you can arrange the proper commission for us, we shall endeavor to place a liberal amount of business for you. Everything sold cash or discounts to reliable trade.

Trusting you will be able to place us in a position to handle your product in this locality, we remain

Yours very truly,

MR. L. L. STORY,

East Fairfield, Vt.

Dear Sir:—

I procured a pound of maple cream sugar at Randolph, Vermont, where I have a farm, and would like to get some more. Kindly send price on 1 doz. cans (1 lb. each), or packages packed ready for shipment, and weight and express rate to New York City.

Also please advise whether you could put this same sugar in $\frac{1}{4}$ lb. packages of same style (a kind of paper) in quantities of 1,000 or more, and if so at what price. Also whether you could furnish them in large quantities, say 10,000 or 20,000 provided a demand should be created.

Please send price on first item (12 lbs.) at once, as I am anxious to get them, or if you prefer you may send sugar at once and I will send check upon receipt.

Very truly yours,

MR. L. L. STORY,

East Fairfield, Vt.

Would you wish to consider a large contract on your maple product?

Please let me know how much you would be able to produce and what you could do as to price.

Yours truly,

DISCUSSION.

PRESIDENT CARLETON: Questions are now in order because these meetings are for that purpose, for everybody to be able to learn, and we, the sugar makers of Vermont are willing to concede that we are not too old to learn, although the remark has been made that you can always tell a Vermonter wherever you see him, but you can't tell him much.

Q. How long will this maple cream keep in storage?

MR. STORY: My experience has been that if it is done down almost to sugar that it will keep a year. I had some, made last spring and kept it all through the warm weather in glass dishes, and it is in pretty good condition now.

MR. PURRINGTON: At what temperature?

MR. STORY: The temperature varies. I have to decide on the temperature according to the syrup; somewhere around 230° or 232°. That is something that must be ascertained by experience. You have got to ascertain the right temperature for every barrel of syrup.

Q. Sell your cream by weight or bulk?

MR. STORY: I have sold by weight, pound and half-pound packages.

MRS. DODD: Have you worked up the cost of machinery?

MR. STORY: No, I didn't bother to do so because there was such a large discrepancy in the cost. The hand power was so high I couldn't afford to use it, so I used gasoline, and the machine cost me about \$150.00—a four horse power gasoline engine. I sugar off my batches to fit the help that is packing it in packages. It takes twenty-five pounds for the dishes I have now ordered. I can substitute larger dishes and handle fifty pounds. It is not convenient for one person to take care of more than six or seven pounds at one time.

MRS. DODD: At what temperature did you put it into the cups?

MR. STORY: It is poked in with wooden paddles. I stir as long as I can,—not after it begins to fly up in chunks. This machine runs at high speed, and when the maple cream begins to fly up I take it off.

Q. Is it necessary to keep it air tight?

MR. STORY: Yes. Any kind of maple sugar will lose flavor when exposed to the air, and it is the same with

maple cream. It will keep all right in a two quart jar. If the syrup is slightly sour it will stand a higher temperature than 230° to 232°. You can make good cream when you can't make good sugar.

Q. Do you put your syrup up hot for keeping?

MR. STORY: I have not, but intend to this next year.

Q. How about the market?

MR. STORY: I have not had any trouble in selling maple cream anywhere. It will sell to houses to which it is hard to sell sugar. They will take maple cream and not haggle over the price, and they will haggle over the price of maple sugar and syrup.

Q. What do you think of establishing an industry for developing this branch of the trade,—the maple cream,—if it would be advisable to have a factory if a man was warranted in going into it on a large scale? You have been to the Dairy Show at Springfield and have learned considerable about the demand for maple cream. Last year I had a call from a commission house in Boston that wanted maple cream, and they stated there was an unlimited demand for maple cream at twenty-five cents a pound. It would be impracticable for farmers to go into this, but on the other hand an organization might make a big success of it.

MR. STORY: That coincides with my opinion, that the proper way to put up this maple cream is to have a plant large enough to take care of a carload order.

Q. How many barrels of syrup did you make up last season?

MR. STORY: Fourteen or fifteen barrels.

Q. How many carloads will your 25-pound machine make? How long will it take you to fill a carload order?

MR. STORY: This machine of mine, if I have eight persons to help, I have to have four sugaring off people and four people stirring all the time, and one reliable man to attend the arches, and one good man to run the kitchen, and another as a helper, I could take care of a thousand pounds a day. A carload is a pretty big thing for any one producer in Vermont. It would take 25,000 good maples to furnish enough good syrup.

MR. ORMSBEE: If all the sugar and syrup in the United States was made into that maple cream there wouldn't be enough to give each person in the United States quite one-

half pound. When you put it on the market don't put it on for a cent less than fifty cents a pound.

MR. PURRINGTON: This seems to be a new product which is coming on to the market, and a new product will stand a higher price than an old one. We have something unique and it will be one of the mistakes of the state if it is started at too low a price. The product is limited and the outlet is unlimited. You can get almost anything in reason for this product. If there is not some co-operative action with reference to this, this part of the business is going to be run into the ground by lack of co-operative action. I believe this is a point where we can start as an Association, and establish something that is fairly uniform as to price and quality.

MR. STORY: That is my opinion, the small producer cannot carry this maple cream business through alone.

Q. How about the dealer, if they try to put up a factory they will try and buy the product from the farmer and it will be the same old thing. I think the better thing is for the farmers themselves to put up a factory and govern their own brand the same as the fruit growers in California. Each locality has its own brand.

MR. STORY: They want a copyright label and a business man who can get the market for their stuff. If they have enough maple trees to furnish a good grade of syrup they have everything they want. I started in marketing right after the sugar season, but didn't sell much until in August. I made my machine in August and have been doing business ever since.

Q. You can take syrup that has stood and make the best quality?

MR. STORY: Not the best quality, but it will make a quality that will sell. You can take sour syrup and make maple cream that is acceptable to the people outside of the maple territory who are not acquainted with the true maple cream. It has a slightly flat flavor.

Q. Is the ordinary syrup too thick for maple cream?

MR. STORY: Any syrup will make maple cream if it is almost sugar.

Q. I understood that you can make maple cream from syrup that was not boiled down?

MR. STORY: You can, but you have to do it down until it gets to the point where it will grain. It is a better plan to keep the sprup in good shape and not allow syrup to sour.

MR. PURRINGTON: My experience has been that syrup can be kept absolutely sweet for years.

MR. STORY: If syrup is put into a receptacle and sealed it will keep two or three years without any difficulty.

MR. CHAPIN: I have had some experience in keeping syrup, and I agree in putting the syrup in hot, not below 100°. I have had syrup keep three years and score 97 points at this Association. I have had a little experience in making cream. It is a new business and we have got to learn how to do it, and I quite agree with you that it could best be handled in a plant, and the department of markets will give us a little assistance. We have a gold mine in this maple cream.

Q. If you put up the syrup hot how do you get rid of the sediment?

MR. STORY: The maple sugar producers should be bound to run the syrup or sugar into packages and leave the niter in. Then at the plant the niter could be drawn out. Those packages could be sealed up beside the evaporator, and you can get a better quality than you can get in any other way.

Mrs. Dodd: On our farm we have been putting the syrup up hot, and I have had glass jars sealed tight at the evaporator, stand for more than three years without even a cloud. We put it through the felt strainers.

MR. STORY: Of course there would not be time in some places to run syrup through felt strainers. You don't want any more men than you can get along with.

Q. How are you going to sell a full gallon and fill your cans with the syrup hot?

A. You couldn't, but where you are putting up maple cream. This would not matter.

MR. PURRINGTON: After a few minutes you can go over and put a little more in before it will cool off. If you wait till it cools off, you get an infection of bacteria. Fill it within fifteen minutes while it is still hot. There will be enough air get out of the can so that it will settle enough to get your gallon in.

Q. You will have to fill it again? A. No, sir.

MR. TOLSTRUP: I don't know anything about maple sugar, but I do know about milk, and there is not any excuse why you cannot fill a can when the stuff is hot. You have to if you are going to keep it, and that can should be weighed, absolutely. What is the use of your putting in

four or five ounces more than you need, or less than you need to? The cans should weigh eleven pounds, or whatever the standard weight is, and if it weighs that when it is warm it is going to weigh very nearly that when it is cool.

I want to say one more thing. You can afford to have a man. Isn't it cheaper to spend half a minute more on each can when you put it up than to spend half an hour on it later? Remember, you cannot get something for nothing, and if you are going to have the work done right you must have the help. There is a possibility of getting help if you will only pay for it, and if the work is good enough to pay for why shouldn't it be done?

MR. STORY: One man can strain 100 barrels of syrup cheaper than 100 men can do it in the sugar house, because that niter does not do any harm. I have had to do that way in order to make a fair quality of maple cream. All the syrup I have had has had more or less niter in it after it is settled. There is hardly anyone in our section who has time to strain syrup.

PRESIDENT CARLETON: As our time is limited this forenoon it might be interesting and of use to us to discuss this further, but I think we have got well waked up to the fact that this is something that we want to think about, and if we wish to discuss it further we will do so this afternoon. As we have two more speakers we will drop this subject and as the cream is what we wish to discuss our next speaker will be on the same subject. Mrs. Dodd of East Corinth.

THE MAKING AND PACKING OF MAPLE CREAM FOR MARKET.

MRS. WALTER S. DODD, EAST CORINTH.

I. DEVELOPMENT.

The old process was simple but arduous. In our neighborhood, some of the best sugar makers, and several of the village people have learned from the old ladies how to make "nubble". Their way was to boil first run maple syrup, a small quantity in a milk pan or stirring pan, slowly and carefully until it waxed on snow or could blow three bubbles through a knotted straw. After cooling it to a waxy consistency, they stirred and stirred the reluctant mass until it creamed and formed a stiff round heap in the middle of the pan. After standing a short time this "nubble" would harden so that it could be wrapped and shipped like a loaf of sugar, too hard to eat until flakes were cut off with a knife.

After learning to make this kind of cream, my mother experimented and learned to make dainty little "nubbles" of very fine cream dropped on a floured board. These made the most attractive and delicious candy, good only while fresh, they dried out hard and tasteless, sometimes capable of standing transportation, but often reduced to one sticky mass by the rough travel or warmth during the journey. On our farm I made the little "nubbles" and wondered if we could not find some way to keep this cream in its original consistency and market it. We found that a little bowlful kept covered did not dry out as the "nubbles" did, and that tight covered boxes would keep it for some time. To make maple cream in larger batches than the little pan of "nubble" then became our study.

In experimenting with different temperatures for our maple sugar cakes, we found that the same temperature was right for both cakes and cream. I should add that our sugar cakes are much more moist than the usual market varieties, to suit the demands of our private trade. Also the cream we make for market is not so hard as the old fashioned "nubble." The demand is for a cream that will spread easily on thin slices of bread, and the consist-

ency of cream cheese seems to be most satisfactory for maple cream.

It may be interesting to know that we have had to make our own tools, and work out all the details of our process as no one in this locality had ever made such cream in commercial quantities. Hundreds of pounds I have made alone by putting aside one pan from each batch of sugar cakes, and stirring it with a large butter paddle, holding the pan on my knees as the old ladies did. The next step was to get a strong masculine arm to hold the pan steady for me so I could use two hands, and next to get the masculine arm to spell mine! Now we use large two handed paddles, ingenious frames to hold the pans that can be quickly released when the instant arrives for pouring, and can keep two men and two women busy on continuous all day's work at cream alone. We boil twenty-five to thirty pounds in one batch which is poured into six or seven stirring pans. It will take us from eighteen to twenty-five minutes to stir one of these pans into cream.

II. MAKING CREAM.

Quality in maple cream depends first upon the grade of syrup used. Good syrup depends for its flavor upon the soil, the age of the trees, exposure of the woods to the sun, prompt gathering and boiling in of the sap, clean utensils and SAFE STORAGE. In most sugar places, only the first two or three runs of syrup can be made into good cream. If sugaring comes early, the larger part of the season's runs are available on our place. Late runs of syrup will make darker colored, stronger flavored cream of poorer texture, waxy not firm.

Clean utensils mean more care than most men folks realize. Sugar cakes will sometimes show a grey color if old tin or galvanized iron is used, and all women know what burned on sugar and lime can do to the color of maple sugar. Maple cream is much more fussy than cakes and will show a grey color to anybody's eyes because it is so much lighter. Then the stirring pans and wooden paddles must be scoured and scalded for each stirring. If a tiny grain of sugar or cream is left behind in the pan it will start crystallization before we are ready for it. The process of making cream like stirring sugar cakes is simply breaking up the large crystals as they form so that the resulting texture will be very fine. The cream is stirred when cool, so we have more time and can break the crystals into smaller grains than can be readily seen. We have

every size of crystal in our maple products from the large rock candy that forms in our heavy syrup and the coarse grain of tub sugar that has been stirred in the sugaring off pan with a hoe to the fine grained cakes and cream on the market today. Cream should be of such fine texture that you cannot discover any grain at all with the tongue. There is a great difference between fine grained cream sugar and perfectly smooth cream. It must have a smooth texture of impalpably fine grains, never waxy| (Differential approaching zero.)

Our paddles are made of hard white maple, cherry wears out and lets splinters into the cream. Maple wears out of course, but if shaped properly, the grain perpendicular to the wearing edge, splinters will not trouble us. All the stirring pans and glass or tin containers should be scoured and scalded just before using. If glassware is washed the day before, it must be carefully covered from the air with sterilized cheese-cloth, to keep out dust and mold spores. Our climate is favorable to bacterial growth and in packing maple cream we have to fight molds. One scientist told me that there was no question but that the stirring of our sugar gave ample opportunity for the sugar to become inoculated with molds and yeasts before we sealed it in our jars. So we try to keep out of our containers these troublesome inhabitants of the air.

The syrup should be boiled rapidly, as for cakes, until long bubbles can be blown through a knotted straw. If boiled to three bubbles or wax on snow stage, it is too hard to spread, too hard to get out of a jar! The temperature we take it off at most regularly is 230 degrees. It must be remembered that this temperature will vary from farm to farm. Our next neighbor whose sugar place is within a half mile, but at a slightly lower level, sometimes cooks sugar cakes ten degrees more than we. The first of the season sometimes gives syrup that will cake at 228° or 229°, and some years I have had to boil it to 231°. This temperature must be determined by each sugar maker. In buying syrup from our neighbors, we have found quite a range in temperature. As a rule altitude is the deciding factor, that is, sugar trees grown on the same level as ours will boil to approximately the same temperature, lower grown trees give syrup that must be boiled longer, to a greater heat, in order to arrive at the same density of sugar.

This temperature we use makes sugar cakes that are soft enough to bite, not gnaw, yet easily molded in tin or wood, perfect for packing, showing some moisture when cut, clear, bright grain when broken. We boil twenty-five

to thirty pounds at a time, and for cream pour it into six or seven stirring pans to cool. It must be cooled quickly. This means that more than one person must take these pans at once to a cooler room or outdoors and set them into snow or cold water. If left for one person to carry them all out the heat would go through to the wood and start crystallization on the bottom. Every care must be taken to keep out drops of water, grains of sugar or of dust, as any foreign substance, or any jarring of the cooling syrup can start crystallization. The syrup is cooled until it does not run, not hard like candy, but holding well to the sides of the pan. Usually 70 degrees is best, early in the season when the sugar kitchen is cool, we can start stirring at 80°. It is not possible to put a thermometer in to find out because the cream must not be disturbed, we can tell pretty well by feeling the bottom of the pan. If a pan is disturbed by a paddle falling into or some such accident, it must be stirred at once.

When the temperature of the room is 60° or over, the stirring can be done with the pans in the wooden frames, without further attention with the thermometer. If the cream stays too cold we can warm it a little, carefully, sometimes the cream will come white and fine grained but too stiff and cold to pour. If poured too cold, it comes out of the pan too slowly and forms air bubbles in the jars which will later become syrupy streaks, so we try to catch it before it stiffens and warm it just enough to pour nicely. If not warmed, the last in the pan will not pour at all and must be forced into the jars, a slow and maddening process when another batch is coming off and time is precious. One man who helped us in the sugar kitchen said we were always hustling to clean up for the next batch!

Although our maple cream is of a different density, making it is much like making white sugar cream, the confectioners' fondant. I have studied the confectioners' process with the idea of using some of their machinery if possible. Their sugar is boiled to 240° or 242°, cooled by running water through pipes in the tank of syrup to 100° and stirred at this temperature, which allows it to run out when creamed into storage tanks. This cream is "ripened" for twenty-four hours, then is reheated to 150°, stirring constantly in steam jacketed kettles until the colorings and flavorings are perfectly blended. Our temperatures are all different because maple cream has more water in it, is softer, and dissolves more quickly in a warm atmosphere. By watching the consistency of the confectioners' fondant

at its various stages, I have been able to approach their handling in our work. We can stir our cream when warmer than we once did. We can safely warm up a pan of cream to pour, for when perfect cream is made, once the size of our impalpably fine crystals is fixed, they will move on themselves so that the whole mass can be easily stirred, like cream ready to be churned into butter. We can also take old cream, after it has stiffened, and warm it carefully to the point where it can be stirred a little, so as to mix chopped nuts with it for candy, stuffed date creams, etc. The whole question of handling the cream after it has set is that of safely warming it. It is safer to use gradually heated water, rather than steam, and the cream must be carefully stirred all the time. This is a question for large scale commercial enterprises that can afford to use big machines, specially constructed devices, and market large quantities. For us it is still easier and more profitable to do the hand work just right, trusting to the instinctive skill that feels in the fingers the proper consistency and the time to pour. There will always be room and special markets for the carefully hand process. There is a dainty texture and well conserved flavor when made in small quantities like ours are made that is much desired by some people. There is a growing demand in town for home made candies, for all the confectioners' great output.

To summarize. The best maple cream is made from our best runs of syrup, boiled till it blows a long bubble, cooled quickly, then stirred for twenty minutes or until it will pour easily so that we can put it at once into the containers, ready for market. To make a uniform product profitably depends upon our mastery of the temperature required at three stages, when it has boiled long enough, when it is cool enough to stir safely, when it is at the right temperature and consistency to pour. If it does stiffen too suddenly to pour well, it will "ripen" in twenty four hours, soften enough so that it can be packed a little at a time in a glass jar. Cream candy, however is much better dipped in chocolate at this first stiffening.

PACKING FOR MARKET.

When we began making maple sugar, tin gallon cans for syrup, twenty-five or thirty pound pails for soft sugar, and thirty pound wooden boxes for cakes were the usual sizes. We soon found that people wanted smaller containers—some of our ten pound tin pails of soft sugar were sawed through sugar and tin to make five pound sizes! We

have steadily decreased the sizes of all our packages. In the years when the smallest and daintiest package to be bought hereabouts was the five pound tin can for soft sugar, we tried hard to find a proper package for maple cream. We went through catalogs of druggists' supplies, of dairy supply houses, we used wood veneer butter boxes for cakes and for pound bricks of maple cream. We tried to get one firm to make us small and dainty wooden boxes for cream, but they did not want to fuss with a small business. Years have brought many changes, and we can now find manufacturers who will make us special boxes, and dealers who will sell us small lots of glass at reasonable prices, although we have not yet arrived at a scale of operations that justifies specially molded glassware.

After the veneer boxes for our first pound bricks of maple cream were used up we were informed that the manufacturers would never make any more. Something must be found, and we tried some attractive brown fibre butter boxes that were advertised in a western dairy paper. These fibre boxes were lined with butter parchment, a good wrapping for maple products, and were safe, as we proved, for the hot soft sugar. Moreover, the manufacturers were willing to make special sizes to hold even pounds of maple sugar, and we introduced them in several sizes to our neighbors. The first few thousands were so well liked in the neighborhood, that large yearly orders have been used ever since. The one pound size is still the standard package for cream among our neighbors. We kept up our search for moderate priced glassware, and now use several types which we purchase of five different manufacturers. The most popular jar for cream is a tumbler which holds three fourths of a pound sealed under pressure with a metal cap and paper washers and linings. People want smaller jars, but they are comparatively expensive to buy and to fill and label.

The sealed glass package is the only safe one for maple cream that is to be kept for fall and winter use. Our moist summer weather is sure to melt or mold any loosely covered maple sugar or cream. Storing cream in a dry place does not work as well as in the case of soft tub sugar. These smaller boxes of cream dry out on the surface very quickly, and often will harden clear to the bottom of a one pound box. The dry cream is as hard as a rock and as tasteless, if dug out, as powdered white sugar. We have used this past season some manilla paper boxes that are so tightly covered that milk and vinegar can be shipped in them. They are quite satisfactory for cream,

soft sugar and syrup that can be used up soon, but they do not keep maple products through midsummer heat, fermentation has occurred too often for us to trust them. They are very cheap and can serve many people like clubs, hotels, tea rooms and such where the cream is sure to be eaten in early summer.

Cream of the proper consistency when poured into glass jars, cooled and stiffened in dry air, and sealed at once will keep indefinitely. We have opened it after years of storing and few can tell whether it is a week or a year old. I doubt if we could tell whether it was two months or two years old. If stored in a warm place it will soften, if air bubbles are left they will show brown syrup streaks, if the jars are not quite full mold will grow on the surface a very little. This mold is easily removed and does not affect the flavor in these sealed packages as it does that of syrup where more air and ferments can reach the surface.

By watching the behavior of maple cream in all these containers we have found out which packages we can guarantee. And when we guarantee our products it means that just as soon as we receive a letter telling of question or dissatisfaction we send immediately a perfect package to replace it. This is an important factor in building up special markets. We guarantee safe arrival of all our glass packages, and perfectly kept flavor throughout a whole year on any maple products sealed in glass. If a lady in New York writes that she wants syrup not too heavy as crystals formed in last year's supply so she lost half the syrup we make up the quantity when sending this year's order. It pays to do this, and in fifteen years of such willingness our loss has been very little. The express companies have always paid our claims on breakage or damage because of heat when packages are marked "keep cool". An absolute guarantee of purity, quality flavor after storing, safe arrival, and clean daintily packed gift boxes means everything in our market, but it costs, not only in time and expense, but in interest and intelligence.

When we attempt to enlarge our market, or find an outlet for our neighbors' syrup which is just as good as ours, we find the first necessity is a careful grading of the syrup that is brought to us.

Uniformity is the first requisite in a market proposition, and difficult thing to attain on several farms with the rather loose standards and careless hand process that prevail now. One lot of cream made for us by a very skilful "old hand" had so many shades of color that it would have been thrown out by a less patient dealer than the

one we were supplying. Ever since then we have made all sugar and cream in our kitchen from the syrup others can make as well as we can. Most people in our neighborhood are afraid of making syrup too heavy, eleven pounds to the gallon is often too dense for our early runs and will crystallize before midsummer. So we have to watch for syrup that is too light weight. No one farm, nor two, could make enough of the grade of syrup we need for our orders of cream, and in buying from any farms we have learned many of the points that must be studied before neighborhood organizations can combine successfully in making large quantities of cream. I believe that there is great hope for better prices for the best syrup that is made in putting it into cream. Uniform packages, absolutely just grading and even careful manufacture of the cream, safe storage of syrup so that fresh cream can be made all through the year, and a capacity for meeting new needs, supplying fresh demands as special markets open, are a few of these. Organized, associated work of this kind needs capital and very careful adjustments and figuring to keep on the right side of the profit and loss account.

Our own enterprise has grown almost too big. We have outgrown the one farm basis, and find ourselves pinched between the old commercial rocks, cost of raw material which is syrup at \$1.00 a gallon, and wholesale prices on the other. So long as we can sell our maple cream direct to the people who eat it, our retail price does not seem too high and we can make a profit, but as soon as we go outside our special market we find it difficult to give the expected reductions on large quantities. It takes just as much strength and patience to make the five hundredth pound as the first. We do our own bookkeeping and office work and have no overhead charges to cut down—but an organization might.

The most striking difficulties we have met in the open market are these—all dealers want a large percent of the selling price. Clubs and women's industrial associations want 20%, stores and specialty shops and tea rooms want 25% to 33%, some even expect 40% like the candy trade. Whenever an interesting new opening shows up we find it costs about the same in the inconvenience of shipping varying quantities just when they want them, or the difficulty of supplying the varying packages, where our small scale operations prevent our carrying a large stock of every kind. Then, too, we must meet the incredulity of wise old market buyers who never saw such products as ours and don't believe it is possible to do such things con-

tinuously and uniformly, Or they tell us we should institute a wide advertising campaign and subsidize some well-known store so that they will keep our stuff before high liver. We do not have to advertise our products and do not attempt to sell our cream to these dealers. An association might reduce the cost of making cream to the point of meeting these demands for profit.

In closing I want to say that it is quite within the possibility of any first class sugar maker to build up such a direct trade as ours. We began by shipping one hundred dollars' worth of sugar to twenty or more people, now we must buy syrup from several farms. We began by selling to a few friends and friends of our family. These first customers fed their friends and our list grew. We proved we could make dainty gift packages and our products went to almost every state and to people abroad. One of these in England asked a London dealer, "Why don't you keep Twinflower syrup? I am told it is the best in the states", and we have supplied the London store ever since. Every Vermont farmer might not be able to make such a large personal list without such city affiliations, but a small advertisement in good publications costs less than one dealer's 25% on a moderate shipment, and good personal letters to such strangers as may answer your advertisements will often bring real friendships to the farm. Every time I go into New York or Boston, I find people clamoring for individual attention to such orders as come to us. Everybody likes to be given special attention, and if one has the capacity to keep straight the details of such a business there is plenty of such business for all of us. All over the West and Southwest are people who write us hungrily of their memories of sugarmaking. Even in New England are Vermont men who cannot find what they call good sugar in the city stores. All that is needed is effort at advertising in individual ways, or organizing so as to send out skilled men to find these markets.

PRESIDENT CARLETON: Now I would suggest that the next fifteen or twenty minutes Mr. Snell, who is with us, speak, and if he is unable to complete his remarks before we adjourn to dinner, we will ask him to take the floor on our return. I take great pleasure in introducing Prof. J. F. Snell, Professor of Chemistry at Macdonald College, Montreal, Quebec.

WHICH SYRUP-FINISHING TEST IS MOST RELIABLE?

J. F. SNELL, MACDONALD COLLEGE, MONTREAL.

Mr. President, Ladies and Gentlemen:

I think it is perhaps a pity that there is not time for discussion of the subject that has been occupying your attention through this meeting. I am going to turn your thoughts in a different direction for a few minutes, but I hope you will find time for further discussion of this very interesting subject, maple cream, later on. I came prepared to give this paper with a lantern, and had some slides prepared, and these tables, which I made hurriedly, are only a poor substitute for the slides that I had.

In spite of the fact that the Standards originally adopted under the United States Pure Food and Drug Act set the upper limit for water content in maple syrup at thirty-two per cent, it has long been recognized by those familiar with the industry that syrup is properly finished when it weighs eleven pounds to the United States gallon. This corresponds to a water content of thirty-five per cent. The Canadian Government in fixing its standards in 1911 adopted thirty-five per cent as the maximum quantity of water allowable, and in 1915 added the synonymous requirements that an Imperial gallon measured at the ordinary temperature of the air should weight not less than 13 lbs. 3 oz.—which corresponds to eleven pounds for a U. S. gallon, the latter being 231 cubic inches as against 277.274 cubic inches for an Imperial gallon. Food Inspection Decision 161, published by the United States Department of Agriculture on Jan. 3rd, 1916, adopts a standard of not more than thirty-five per cent of water and a weight of not less than eleven pounds to the gallon as a guide for the officials of the department in enforcing the Food and Drugs Act. In either Country, then, maple syrup containing over thirty-five per cent of water is liable to be declared adulterated.

To keep within the law, therefore, the syrup-maker must boil to the proper density of eleven pounds to the gallon or 35½ degrees on the Baume hydrometer at room temperature. But there is also another consideration which renders it important for the syrup-maker to avoid finishing his syrup with an excess of water. This is that thin syrup

is much inferior in *keeping* quality to syrup properly finished. The micro-organisms which destroy or impair the delicate flavor of maple syrup grow and thrive in a thin syrup while a syrup of correct density proves an unfavorable medium for them. Good flavor is the chief basis of value in maple goods and the maker cannot afford to take risks in that direction. Thus both the law and the profits condemn watery syrups.

"Better, then, to over-concentrate than to under-concentrate the syrup?" Yes; but there are objections to over-concentrating also. In the first place over-concentration obviously decreases the yield. The sap that would make 100 gallons of syrup with 35% of water will make only about 95½ gallons of syrup with 32% of water, 97 gallons of syrup with 33% of water or 98½ gallons of syrup with 34% of water. Thus, the proceeds from the syrup sales would be decreased by 1½, 3 or 4½ per cent according as one over-concentrated to the extent of 1, 2 or 3 per cent of moisture content.

Nor is that all. Over-concentrated syrup is very apt to deposit sugar crystals. In the minds of many consumers this excites suspicion of adulteration and, groundless as it is, such suspicion is unquestionably injurious to trade.

One Ontario maker is sending me a sample of syrup wrote: "I try to get it as near 13 3-16 lbs. per Imperial gallon as I can but sometimes I get it too heavy. Then my consumers are good enough to tell me that I put sugar in the syrup and accuse me of fraud and such stuff." And even customers who have perfect confidence in the purity of the goods are annoyed by the formation of sugar crystals. In the spring of 1914 I bought from Quebec Cheesemakers' Cooperative Association as beautiful a sample of syrup as I could find among the products of the members of the Pure Maple Syrup and Sugar Co-operative Agricultural Association, whose goods the Cheesemakers' Association was handling. I sent a gallon of this syrup to my mother. Some time later I received a letter as follows:—

"I wish to ask you about that lovely maple syrup you sent us. It certainly was the best yet, but at the bottom of the can there are great lumps of candied sugar, so hard that I can't get it dissolved. It seems too bad not to use it all, for it is so good. I thought if I told you about it you might find a remedy and not have it that way next year. We all have enjoyed the syrup so much but there must be a reason for it forming into hard sugar at the bottom."

Of course there is a reason. The maker had over-concentrated his syrup. If he had finished it at the correct density he would have had more syrup to sell and at the same time would have left his customer better satisfied.

It appears to me that some scientific work upon the conditions governing the disposition of sugar crystals in maple syrup would be of value. From a theoretical standpoint one would expect the liability to crystallization to be greater the density of the syrup. The few observations we have made corroborate this expectation and appear to indicate, further, that the liability to crystallize increases rapidly after the water content gets down to 33 per cent. I am going to present these results with reservation as I do not feel satisfied with the work and hope to repeat it with greater care at some future time.

In the season of 1914 we put into cold storage 118 small samples of maple syrup which we had received from farmers for a purpose to be referred to later in this paper. These were put into the cold storage room of the Macdonald College kitchen as they were received and were examined at intervals of one month to see whether crystallization of sugar had occurred. They were in cold storage from 3 to 5 months. The temperature of the cold storage room ordinarily ranges from a few degrees above freezing to 48° F. In this time, as Table I shows, sugar was deposited in 80 per cent of the samples containing less than 32 per cent of water, in 50 per cent of those containing 32 to 33 per cent of water, in 36 per cent of those containing 33 to 35 per cent of water and in 8 percent of those containing over 35 per cent of water. As this 8 per cent embraces only two samples and the bottles were not sealed I do not feel sure that crystallization ever does occur in syrup with 35 per cent of water, even under the rather severe test of 5 months' cold storage. In more concentrated syrups, however, the liability to crystallize is very considerable. More than one syrup out of every three having 33 to 35 per cent of water crystallized, one out of every two having 32 to 33 per cent crystallized and four out of every five having less than 32 per cent of water crystallized.

I have said enough to convince you, if any convincing was necessary, that it is very important to have a satisfactory test for the density of maple syrup. It is by no means easy to judge accurately and quickly when a syrup has reached the proper density and is ready to be drawn off from the evaporator. I am satisfied that a great many makers over-rate their own skill in this matter. A number of different tests are employed and there is by no means unanimity as to their respective merits. Of course, much depends upon the individual. Some makers—especially those of great experience—no doubt have accurate judgment with the particular test to which they are accustomed.

But just how accurate this judgment is can only be determined by checking their results by scientific measurements. If this were done in every case I have no doubt that some makers would be astonished to find how far their own judgment of their skill was at fault.

To make a fair comparison of the merits of the different finishing tests we must eliminate as far as possible the effect of the variable skill of the operators. This can be done by comparing the results obtained in the use of the tests by a large number of individuals. This I attempted to do in the season of 1914 when I issued a public invitation to farmers to send in small samples of their syrup with a statement of the test used in finishing it. It was my desire to get results on about 1,000 syrups but actually only 136 were received in answer to the invitation. Fortunately, we had pertinent information upon 126 syrups collected in 1913, so we were able to make comparisons on the basis of 262 samples. A simple measurement with an optical instrument, known as a refractometer, enabled us to determine the water content accurately and by comparing the results obtained by the different finishing tests we were able to arrive at some general conclusions.

Of the 262 syrups investigated 229 were finished according to three tests—111 by the thermometer test, 65 by the dipper test and 53 by the use of a hydrometer or so-called "saccharometer". Among the remaining 33 syrups a few were tested by depositing a drop on a finger nail and noting whether it ran or flattened out, or if it remained in a round drop, several by cooling and noting the appearance of the cold syrup, and in a number of instances the method of testing was not clearly indicated. For our present purpose only the three main tests need receive consideration. The results obtained with these are shown in Table II and in the charts, particularly Chart II. In the table the syrups finished by each test are arranged in order of water content, each group representing a range of 0.5 per cent. The groups 34.5 to 35.0 and 35.0 to 35.5 are lined off as including all syrups within 0.5 per cent of the correct density. It will be noted that the thermometer test placed 16 per cent of its samples within this range, the dipper test 9 per cent and the hydrometer test about 5½ per cent. None of the tests have placed by any means a satisfactory proportion of the samples within 0.5 per cent of the correct density but considered by itself this fact speaks well for the thermometer test. If instead of 0.5 per cent we allow one per cent of variation each side of the correct density we again find the thermometer test coming out with decidedly

the best record with 32.5 per cent of samples correctly placed or practically one out of every three. Allowing this range of play, however, the hydrometer test comes out better than the dipper test, the former placing 19 per cent, the latter only 17 per cent within the correct range. But there is another point to be considered. It is very obvious from the table that syrup-makers have a general tendency to over-concentrate their syrup. Thus we find that those who use the thermometer test have placed 60 per cent of their products in the range of 31.5 to 34.5 per cent of water, while those who use the dipper test have 52 per cent within that range, and the hydrometer men no less than 70 per cent. These numbers of samples it will be noted are all within a range of 1.5 per cent. each side of 33 per cent water. In other words if the makers had been aiming at making 33 per cent syrups with an accuracy of $1\frac{1}{2}$ per cent each way 60 per cent of the thermometer men, 52 per cent of the dipper men and 70 per cent of the hydrometer men would have had their shots on the target. Let us next see how many have come within $1\frac{1}{2}$ per cent of 35 per cent as the bull's eye centre, i. e. within the range 33.5 to 36.5. We find the numbers to be approximately, thermometer test $42\frac{1}{2}$ per cent, dipper test 23 per cent, hydrometer test $26\frac{1}{2}$ per cent—in every instance much smaller proportions than came within the same distance of the 33 per cent centre. It is clear then not only that all have been shooting around a mark of 33 per cent water rather than one of 35 per cent water, but also that the hydrometer men have had a greater tendency to do this than the others.*

But let us not allow our target analogy to mislead us. We have already admitted that over-concentration is preferable to under-concentration—that to make the syrup 33 per cent water is much safer than to make it 37 per cent water. So there is a certain amount of justification for our makers concentrating their shots on one side of the 35 per cent mark. If we allow the variation of $1\frac{1}{2}$ per cent each way, the best position for the centre of the target will be 34 per cent of water. If we always succeeded in keeping within $1\frac{1}{2}$ per cent of this bull's-eye we should *never*

*Although not affording any comparison among the methods of finishing, the determinations of water content in some 460 genuine syrups reported by Dr. McGill in Bulletin 226 of the Laboratory of the Inland Revenue Department illustrate in an even more striking manner the tendency of our syrup makers to overconcentrate their syrups. Only 21.2 percent of these syrups fall within the range 33.5—36.5, while 47.3 are between 31.5 and 34.5 and no less than 59.4 per cent between 30.0 and 33.0 per cent, i. e., grouped about the bull's-eye of 31.5 per cent water.

make syrup of over 35.5 per cent nor of under 32.5 per cent water content. The former limit would be reasonably safe both in respect to the law and in respect to liability to fermentation. The latter, 32.5 per cent, would be reasonably, though by no means absolutely, safe as respects sugaring. Comparing our methods on this basis we find that the thermometer test places 59½ per cent, the dipper test 44 per cent, and the hydrometer test 55 per cent within the circle. Upon this basis the case for the hydrometer test shows a decided improvement. In placing syrups within this most desirable of all ranges the hydrometer has been almost equally successful with the thermometer.

If we glance over the number of instances in which the tests gave very bad results syrups grossly over-concentrated and especially syrups grossly under-concentrated—we see that the hydrometer test has proved by all odds the best of the three. Of syrups with over 37 per cent of water it has given only 1.8 per cent—which means only a single sample out of the 53, whereas, the thermometer test has given 8.1 per cent or 9 samples out of the 111, and the dipper test no less than 26.8 per cent or well over one fourth of the samples examined.

Our diagrams are simply another means of making the same comparison of the results obtained by the different methods of testing. In Chart I we have plotted for one test and for one year's results only the percentage of syrups falling within the various ranges of temperature. This gives a curve with many ups and downs, which frequently runs down to zero percentage because no samples happened to fall within certain ranges. My object in showing this curve is mainly to make the point that this method of plotting is unsatisfactory and so to justify my adoption of the other method according to which Charts II and III were drawn. This method was suggested to me by a paper to which I had the pleasure of listening at a convention of the American Association of Poultry Instructors and Investigators some time ago. Dr. Raymond Pearl was illustrating the effect of some factor upon the laying of hens. Here he met with the same difficulty in plotting results as we have found in our work. Whenever the hen missed laying for a day his curve fell to zero. To overcome this difficulty and get a smooth curve, he resorted to the expedient of averaging five (or some other odd number of) successive figures and plotting the averaged result in place of the central figure of the five. Applying

this method to the thermometer test results in our table we get the following figures to plot on our diagram:

Water Content.	Per cent of Samples.
27.25	.00
27.75	.18
28.25	.36
28.75	.36
29.25	.54
29.75	.72
30.25	1.26

Dr. Pearl assured his audience that this method of plotting was recognized by mathematicians as a suitable one for problems of this nature. As applied in Chart II and III it affords a very good visual comparison of the merits of the three methods of testing maple syrup. Chart II represents the results of the two seasons 1913 and 1914, Chart III those of 1913 taken by themselves.

Comparison of the three curves on either of these diagrams shows at a glance that in the matter of precision both the thermometer test and the hydrometer test are decidedly superior to the dipper test and that of the two the hydrometer is distinctively more precise in its results than the thermometer. In both Charts the hydrometer-tested samples are seen to be nearly all within the limits of 31.0 to 36.0 per cent of water content while both the other tests, and particularly the dipper test, give a considerable number of syrups outside this range and especially on the more objectionable side of it—that of excessive water content. This, of course, does not mean that one maker may not be more successful with the thermometer test or even with the dipper test than another with the hydrometer. But it does show that in actual practice by all sorts of syrup makers the hydrometer gives clearer-cut results than either of the other methods, and that the thermometer test, although not the equal of the hydrometer test, is far and away more precise than the more primitive test of “aproning” from a dipper.

A point of defect in the hydrometer test to which I have already alluded is also illustrated by our curves. The hydrometer test as used at present has too great a tendency to lead to overconcentration of the syrup. If our makers are boiling to a density of 30.5 degrees as measured in the hot syrup I would suggest that they try boiling only to a density of 30.0 or 30.25 degrees—especially those of them

whose syrups have been analyzed and found over-dense and those who have had trouble with crystallization.

SUMMARY.

1. Comparison has been made of the water content of maple syrups of 1913 and 1914 finished according to various methods of testing.

2. The order of precision of the three main tests is as follows:—

(1.) Hydrometer. (2.) Thermometer. (3.) Dipper.

3. There is a general tendency to overconcentrate the syrup though a considerable number of makers run to the opposite and more objectionable extreme of underconcentrating.

4. The hydrometer test as ordinarily applied tends to lead to overconcentration. It is suggested that makers who have been concentrating should adopt a test of 30 or 30 $\frac{1}{4}$ degrees in the hot syrup instead of one of 30 $\frac{1}{2}$.

TABLE I.

PROPORTION OF SAMPLES SUGARING IN COLD STORAGE,
OF FROM 3 TO 5 MONTHS DURATION, 1914.

Water Content. %	Total Number of Samples.	No. Samples Sugared.	Percent of Samples Sugared.
Less than 32	25	20	80
32 to 33	22	11	50
33 to 34	31	11	36
34 to 35	16	6	37
Above 35	24	2	8
Total	118	50	42

TABLE II.

MAPLE SYRUP 1913-1914.

METHODS OF FINISHING

Percent of Samples Finished by Each Test Falling Within the Various Ranges of Moisture Content.

Percent of Moisture.	Thermometer Test. Percentage of Samples.	Dipper Test. Percentage of Samples.	Hydrometer Test. Percentage of Samples.
28.51 to 28.99	0.9	0.0	0.0
29.00 to 29.49	0.9	0.0	3.8
29.50 to 29.99	0.0	1.5	0.0
30.00 to 30.49	0.9	0.0	1.8
30.50 to 30.99	0.9	4.6	1.8
31.00 to 31.49	3.6	0.0	7.5
31.50 to 31.99	4.6	9.1	3.8
32.00 to 32.49	13.4	7.5	17.1
32.50 to 32.99	9.9	19.7	19.0
33.00 to 33.49	11.7	6.2	15.2
33.50 to 33.99	9.9	6.2	5.1
34.00 to 34.49	10.8	3.1	9.5
34.50 to 34.99	9.0	1.5	1.9
35.00 to 35.50	7.2	7.7	3.7
35.51 to 36.00	5.5	4.6	3.8
36.01 to 36.50	0.0	0.0	1.8
36.51 to 37.00	2.7	3.1	1.8
37.01 to 37.50	2.7	4.6	0.0
37.51 to 38.00	2.7	1.5	0.0
38.01 to 38.50	4.9	1.5	0.0
38.51 to 39.00	0.9	3.1	0.0
39.01 to 39.50	0.0	1.5	0.0
39.51 to 40.00	0.0	1.5	0.0
40.01 to 40.50	0.9	1.5	0.0
40.51 to 41.00	0.0	1.5	0.0
41.51 to 42.00	0.0	1.5	0.0
42.01 to 42.50	0.0	1.5	0.0
43.01 to 43.50	0.0	1.5	1.8
43.51 to 44.00	0.0	1.5	0.0
44.51 to 45.00	0.0	3.1	0.0
Total	100	100	100
Actual Number of Samples	111	65	53

TABLE III.

COMPARISON OF SYRUP-FINISHING TESTS.

Grouping of Samples about Certain Centers of Water Content.

Center.	Per cent of Water. Range.	Limits.	Per cent of Samples Falling Within the Range.		
			Thermometer Test.	Dipper Test.	Hydrometer Test.
33.0	1.0	32.5—33.5	22	26	34
34.0		33.5—34.5	21	9	15
35.0		34.5—35.5	16	9	6
33.0	2.0	32.0—34.0	45	40	56
34.0		33.0—35.0	42	17	32
35.0		34.0—36.0	32½	17	19
33.0	3.0	31.5—34.5	60	52	70
34.0		32.5—35.5	58½	44	54
35.0		33.5—36.5	43	23	26
		Over 35.5	16	33½	9
		Over 37.0	8	26	2

INFERENCES.

The tendency to over-concentrate is general but is more marked with the hydrometer test than with the others.

The dipper test is decidedly inferior to both the others. In placing syrups within the most desirable range (32.5—35.5) the thermometer and hydrometer are about equally successful.

The hydrometer test yields the smallest proportion of thin syrups.

DISCUSSION.

MR. STORY: All the hydrometers we used have 60° as the temperature at which they should be used.

PROF. SNELL: I am not very certain as to the exact relation between the hydrometer reading and the water content because I have not studied it myself. I have taken my statements from what I have read.

Q. Were those tested thermometers that were used by the makers of the syrups?

PROF. SNELL: Yes, by the makers of the syrups.

MR. PURRINGTON: You didn't take the boiling point of that syrup?

PROF. SNELL: No, I didn't have the syrup until it was finished. I tested the water content only.

MR. PURRINGTON: I was wondering if their thermometers are within a reasonable range of accuracy?

Prof. Snell: They were the usual run of thermometers as used by the makers.

MR. CHAPIN: Another thing would be the range in altitude, wouldn't it?

PROF. SNELL: Yes. The hydrometer test does not depend on the barometer. The hydrometer will give the same results in all kinds of weather.

MR. CHAPIN: That also varies in hot and cold syrup?

PROF. SNELL: Yes, varies in reading. As our Canadian men use the test they have a metal cylinder inside the evaporator and they dip some of the boiling syrup into this metal and throw the hydrometer in it. The metal is hot with the steam so that the syrup is very little below the boiling point at the reading.

MRS. DODD: Couldn't we have hydrometers accurate so that we could read them in the boiling syrup as well as the cold syrup?

PROF. SNELL: Yes, they do have them. Our syrup makers in using it had a tendency to concentrate more than when they used the other test.

MR. PURRINGTON: Didn't they test at too high a temperature?

PROF. SNELL: That is because they were instructed to read it at $30\frac{1}{2}^{\circ}$ in the hot syrup, and that appears to be too high. At 30° they probably would have their syrup about right. By testing your gallon of syrup and weighing it you could get a reading on your hydrometer that would tell exactly.

ADJOURNMENT TILL AFTERNOON.

FRIDAY AFTERNOON.

PRESIDENT CARLETON: Prof. Snell will now continue his remarks of the morning.

PROF. SNELL: I think I have already said everything that I had written down, and there are only one or two points that have occurred to me since that I ought to speak of. I fully expected, when I came to Vermont, I would find more of these hydrometers and better forms of them than I have seen up in Canada. As a matter of fact I had a good deal of difficulty to find one here, and it is much like

those I have seen there. It is graduated from 0 to 50°. For maple syrup testing there is a good deal of that scale that is useless. You don't need to go to 0 and you don't need to go to 50, and it seems to me that an instrument with 15° at the most, or 25 to 40° would enable us to do much more precise work and be in every way as useful as this one. You would have 15° in the same space that we have 60°. That is a degree on a scale four times as long, and you could read it much more accurately. There are such instruments in use. Those who are buying syrups sometimes have these 25 to 40°. I think we need to learn a little more about just how to use these instruments. I am not sure why 30½° is the right reading,—the right test in hot syrup. From the little experience I have had I should say the syrup was done before it gets to 30½° and that 30° would be all right. I am not quite sure either, as I have not tested, but just taken my idea from what I have read, that 30½° at the boiling point will give 35½° when the syrup goes down in temperature.

There is a point in reading some of these hydrometers about which some of you may be doubtful, and about which there should be some agreement. Put a test like this into the syrup and the syrup stands up against it. You may be doubtful whether to read here the highest point of the liquid or down here at the level. In sugar factories they read at this level, and there ought to be some agreement as to how you are going to read them. I think the best is at the level. You need to fill the little cylinder right to the brim and read straight across.

MR. STORY: Doesn't it make a difference whether you drop it into the syrup and let it rise up or allow it to rise very easily?

PROF. SNELL: The sugar chemists let it down very gently so that it does not go down and come up again.

MR. STORY: The syrup that sticks on the tube weighs it down a little?

PROF. SNELL: Yes, it would a little.

MRS DODD: Air bubbles will form on it. The air bubbles would stick to that and the hydrometer wouldn't read at all. Even after it was boiled to the proper temperature or the air bubbles had settled it was difficult for us to put a hydrometer in so that the air bubbles wouldn't stick to it.

PROF. SNELL: You would have that difficulty with cold syrup, but with syrup just from the evaporator it ought not to.

Q. You read the hydrometer at $30\frac{1}{2}^{\circ}$ for eleven pound sugar?

PROF. SNELL: Yes, that is the rule I have learned from others, but my experience leads me to think $30\frac{1}{2}^{\circ}$ is high, that 30° would be nearer right.

MR. SPEAR: Our experience has been $31\frac{1}{2}^{\circ}$ hot.

PROF. SNELL: All I can say is these farmers had instructions, as far as our bulletin is concerned, to avoid the $30\frac{1}{2}^{\circ}$ in hot syrup, and it is evident from the results that they were getting the syrup denser than was necessary.

MR. SPEAR: I test large quantities of syrup and I would say that Welch Bros., were up in New York State and they got into trouble in Canada. They were there two or three days before they took any syrup, and they called out the government inspector of weights and measures. For the last ten to fifteen years we have taken in syrup at 32° , that is, at the boiling point, and 36° the cold syrup, is probably anywhere between 55 and 65 or 70, and you take in syrup that will test just 36 and we never have any trouble with crystallization, and the same with 32° . Just four degrees between, on the hydrometer, the boiling point and the cold syrup.

PROF. SNELL: If one is buying syrup he doesn't pay to have it very concentrated,—he gets more for his money.

Q. Will 30° or $30\frac{1}{2}^{\circ}$ syrup weigh eleven pounds? We buy it by weight. The farmer gets a trifle more for heavy syrup. We don't want it over 36 because we lose some by crystallization. It will crystallize about 36.

PROF. SNELL: I have not tested that question in the laboratory. All that I have is the result of the farmer's work, and they were getting it over concentrated.

MR. SPEAR: Our hydrometer was graduated fifteen points, and we could get $\frac{1}{2}$ and $\frac{1}{4}$ th. If over one half we gave the farmer the other half degree so that $35\frac{1}{2}$ would be considered 36.

BUSINESS SESSION.

PRESIDENT'S ADDRESS.

A. A. CARLETON, WEST NEWBURY, VT.

*Ladies and Gentlemen of St. Albans, Friends and Members
of the Vermont Maple Sugar Makers' Association:*

As our time is going fast and we have to concentrate our talks into a short time, I shall try and say what I have to say, to you in just about fifteen minutes. I started out, as usual, to write up something that I thought would be appropriate for the occasion, but I find upon getting here that only a little of that is matter that I can use, as a great many points which I intended to present to you have already been used and other ideas have been forced in upon my mind, which I think should be looked to and thrashed out in the few moments that we have. Also, our business meeting for the election of officers is at three o'clock, and some of our members wish to leave at four.

It is customary for our president to give an annual address, but as this is the fifth time I have been permitted the pleasant privilege of speaking to you in that capacity, you will readily see my supply of material along the line of the maple sugar subject must be nearly exhausted, and as one person remarked upon hearing of my re-election last January, he thought the Maple Sugar Makers of Vermont were mighty hard up for timber. I think so myself. However, we will let that pass for the present.

We have met in your smart little city of St. Albans, to hold our twenty-fourth Annual Convention. That it is a success has been already proven, our welcome has already been shown by your hospitality, for which we thank you.

In the five years' experience I have had as head of this organization I have observed four things as essential and absolutely necessary to the Vermont Maple Sugar Industry.

First. Grading.

Second. Proper labels.

Third. Standardizing.

Fourth. Marketing.

Proper grading is a very difficult problem as the judgment of different producers or men vary, as the length of blades of grass in a field, no two alike. The label question is not so difficult as a standard authorized label backed by the state and well introduced to the public is sufficient. The correct method for standardizing our product is yet to come.

How to market our grades to advantage so we may receive a just return for our labor, and interest on investment is the great question of the hour. They have placed fine exhibits of our Maple product at great Expositions held in several of our large cities, but where we have fallen short of finishing our good work is not having goods for sale to prove their quality. It is like a child seeing a stick of candy and then not letting him have it. How does he know whether it is good or not? He wants it. So do the public when they see our fine display of Maple products, and they are willing to pay well for it, as was proven at the National Dairy Show at Springfield last fall when we sold over \$600 worth of sugar and cream; yet that was a small amount of what could have been used as we were unable to get more at that time, not knowing in advance how much we should use.

Of course, the profit is small but the benefit to be derived from the publicity of our product will be realized in the years to come.

The Publicity Dept. of the State has done and is doing a great work for us. As a new scheme they have asked me to prepare an exhibit and decorate a large window in one of the largest wholesale and retail stores in Boston about the first of March. They handle large quantities of Vermont Maple Sugar and Syrup and want the best. This I shall try and get from Syrup exhibited at this convention.

Proper advertising, grading, package, and marketing is what makes the business pay. An up-to-date farmer should have his letter and billheads, leaflet for correspondence, now and then a calendar, etc., setting forth the different lines of agriculture and breeds of stock in which he is specializing, a little less drudgery, a little more figuring with head and lead pencil, a lot of good fellowship and cooperation, would make farm life better for man and beast, and perhaps for the woman. We have been told that Vermont was the bashful State, that she would not fight until she was obliged to, that the farmer was obliged to fight for our living, and either dig or die was a good cure for our bashfulness, and the past few years has proved that Vermont is not slow along the improvement line.

Thanks to the Publicity Bureau and Extension Dept., there is also good fellowship among our people.

This bashfulness and the dig or die problem, it seems to me, has been brought out more fully at this convention than at any other time, and I don't know but you have observed it as well as I. There is something doing, something in the wind in regard to the handling of our maple product in this state. Either the sugar makers of Vermont are going to put their shoulders to the wheel and handle it themselves, or outside capital is going to handle it for us and make the almighty dollar. Now it is up to us at this convention to make some move, to incorporate some idea of organizing so that we may have the handling of this, and not some one else. If there is anyone capable of figuring out this problem it seems to me it is the Vermont Yankee, and we should have the credit of it. As was shown to us in the address of yesterday afternoon, things are changing along all lines, and it seems to me that the time has come when, if we could organize to handle this maple cream problem it would be for our benefit. I don't know how to suggest a scheme whereby we could do it, but it seems possible to me that we might have a concentrating point in each county and have this governed by one head, one manager, one supreme head over them all, so that we might have a factory for turning out this maple cream in sufficient quantities so that we could supply the demand for carload lots. If we once got this commodity so stamped upon the public mind, the same as the Cream of Wheat, Ivory Soap, or any of these different names with which we are familiar, Vermont Maple Cream at a fancy price,—the farmer should get \$1.25 to \$1.50 a gallon for his syrup in bulk to make this quantity, once it is established. I hope you people will think of this point.

I am not going to take up much time in speaking because I know you are all thinking seriously, and as we want to hold our business meeting I want to close by saying that we want to take the motto adopted by the Stage Grange of Michigan, "Good, Better, Best, let us never rest until our good is better and our better best."

We have worked to advance and get our prices and our quality. We people,—I don't say it to brag or anything else because there are lots of you have worked out, and follow the same line,—but there are lots of people in the state that don't know what to do with their output, and those we are trying to help. For myself I have my own correspondence sheets and envelopes, also a small leaflet which I enclose, and which I suppose I have sent to a good

many of you in my correspondence. Last year I secured orders for more than \$300 worth from the very nicest trade, life insurance offices in Connecticut, where they want the very best that can be made and are ready to pay for it. If I had sent them a price list written on a common sheet of white paper I would not have received their orders for goods at almost any price. This shows what a person can do if he has the go-to-it-iveness to get the trade.

MRS. DODD: That sort of thing does not cost a great deal.

PRESIDENT CARLETON: We will now have the secretary's report, and then the treasurer's report.

REPORT OF THE SECRETARY.

H. B. CHAPIN, MIDDLESEX, VT.

Your secretary's report for the past year which has been a prosperous one for the association, will be found mostly in the treasurer's report which he will present.

Our last previous meeting was held in Brattleboro in pursuance of our policy of migrating from one section of the state to another each year. While the attendance was not as large as in some former years the interest was good and papers of much value were presented by people trained in their several lines of work. These papers together with a list of prize winners will be found in our 1916 report which has been delayed somewhat but is now or soon will be available.

In 1915, the Business and Professional Men's Association sent us a very cordial invitation to come to St. Albans and this kind invitation was renewed last year with assurance of the hearty support of an interested community. This association felt it a duty and a pleasure to accept these overtures, and as a result we are now in session in this city, and I hope and believe that each member will diligently strive to get the most good possible from these meetings.

Last year the Secretary of the Vermont State Horticultural Society suggested that we might meet at some future date in a joint convention with them, stating that they contemplated going to Bennington for their next meeting, and as we were practically committed to St. Albans, we did not get together this season. I bring this matter to your attention as showing the attitude of the Fruit growers and Horticulturists and leave it in your hands.

Our membership has shown a steady increase for the past few years and while we have not yet touched the high water mark in numbers that were attained during the early years when a bounty was offered on sugar production, we have now about 500 members. Not all of these have paid the annual fee of \$1.00 each year, but I find that a person who has once joined the association wishes to be considered a member, and trust all will assist the association by not getting in arrears.

We hope to go on increasing our membership till we have at least one-half of the producers of the state interested in our organization.

Personally I wish to thank the Business and Professional Men's Association for all the assistance they have rendered and without which this successful meeting would not have been possible. And I will state that we have an invitation to come again next year from their president, Mr. W. D. Chandler.

REPORT OF THE TREASURER.

S. A. MERRIFIELD, WILLIAMSVILLE.

Receipts and Disbursements for 1916.

RECEIPTS.

Jan.	1	Balance in treasury,	\$ 2.81
		State appropriation,	500.00
		Received from Mr. Vail,	41.65
	27	Received from Mr. Chapin,	173.58
May	15	Received from Mr. Chapin, 124 member-	
		ship dues,	124.00
		Sale of labels,	25.80
Nov.	20	Received from Mr. Chapin,	13.40
			\$ 881.24

EXPENDITURES.

1915.			
Nov.	17	H. W. Vail, expenses,	\$ 8.15
1916.			
Jan.	8	Brooks House, Officers and Speakers,	30.50
	29	Postage,	1.50
	31	Prof. Stephen, Speaker from Syracuse,	20.74
		A. A. Carleton, expenses to Jan. 22,	42.01
		D. W. Edson, printing,	14.65
		Mrs. Blanche L. Pike, mileage and expen-	
		ses at Brattleboro,	9.78
		Mrs. Nellie L. Emery, mileage and ex-	
		penses at Brattleboro,	9.78
		Class A Premiums,	50.00
		Class B Premiums,	40.00
		Class C Premiums,	7.00
		Class D Pro rata premiums on syrup,	132.50
		Class E Pro rata premiums on sugar,	34.00

Feb.	7	Boston Chamber of Commerce for J. C. Orcutt's expenses,	10.23
		W. E. York, mileage, Bristol to Brattleboro and return,	5.25
		C. O. Ormsbee, Montpelier to Brattleboro and return,	5.15
	8	H. W. Vail & V. I. Spear, mileage Randolph to Brattleboro and return,	9.81
		H. B. Chapin, expenses to Jan. 10, 1916,	49.75
Mar.	15	D. W. Edson, printing,	3.95
Apr.	3	H. W. Vail, to meet check given by him while Treasurer,	6.00
May	11	Mrs. J. B. Chase, for premiums for the garden class,	5.00
	16	D. W. Edson, printing,	2.10
		Buck Printing Co., labels,	65.57
June	27	N. D. Clawson, reporting proceedings,	37.50
Nov.	27	H. B. Chapin, expenses and salary,	47.52
		A. A. Carleton, services to Feb. 1, 1916,	10.00
		A. A. Carleton, Association expenses at National Dairy Show,	75.00
		Balance,	147.80
			<hr/>
			\$ 881.24

MR. SPEAR: I move the reports of the secretary and treasurer be accepted and adopted.

Motion seconded and carried.

ELECTION OF OFFICERS.

PRESIDENT CARLETON: The first officer to be elected is some one to serve as president for the ensuing year.

MR. MARTIN: I nominate the present incumbent, Mr. A. A. Carleton, to succeed himself.

Nomination seconded, and carried, and Mr. Carleton declared elected.

PRESIDENT CARLETON: I wish to thank you from the bottom of my heart. I appreciate the fact that you wish to do me the honor of re-electing me to this office. I also appreciate the fact that one man should not stand in the way of advancement for others, and there are others who might see further ahead into the future than I. I have worked hard for you and have helped to the best of my ability, and have done this freely and willingly, and assure you I have enjoyed it all. But I must ask you to excuse me from serving you for another year. Last year I told you I would serve another year if it was for the good of the Association. Now I thank you for the honor, but I shall resign, so please nominate some one else for your president.

MR. ORMSBEE: I move that we pass over the remarks of the president and proceed to the election of a secretary.

Motion seconded.

PRESIDENT CARLETON: I absolutely refuse to serve another year. If it is in order for me to make a nomination I shall resign in place of Mr. Chapin to serve you as president for the ensuing year.

MR. CHASE: I move that we excuse Mr. Carleton from serving again as president.

MR. SPEAR: I always did believe in fair play, and I remember that last year we had some such contest as is now on, and there was an agreement, practically, on the part of the Association, that if Mr. Carleton would take the office for this year that we would not ask him to sacrifice himself again. In fairness to him we should relieve him of this work since he feels that he has carried it as long as he can. I second the motion that we excuse Mr. Carleton.

Motion carried.

MR. CHASE: If it is in order I nominate Mr. Chapin, of Middlesex, to serve as president.

Nomination seconded, and carried, and Mr. Chapin declared elected.

PRESIDENT CARLETON: I wish to thank you again from the bottom of my heart for the assistance you have given me in the past five years, and will now ask Mr. Chapin to take the chair.

PRESIDENT CHAPIN: I thank you very much for this expression of confidence. The next officer to be chosen is secretary.

MR. CARLETON: Perhaps it is not in order for me to speak at this time, but we know that we have had in the past year a very competent man as treasurer, and we know the hard position it is for a secretary who is unfamiliar with the workings of our organization if he is some one who has never served on the board of officers. I take pleasure in nominating for the position of secretary of this Association our treasurer for the past year, Mr. Merrifield, of Williamsville.

Nomination seconded, and carried, and Mr. Merrifield declared elected as secretary.

PRESIDENT CHAPIN: The next officer is some one to serve as treasurer.

MR. ORMSBEE: We have got a good thing and we had better hang on to it just as long as we can, and I move that we stick by Mr. Merrifield.

MR. MERRIFIELD: I appreciate Mr. Ormsbee's kind intention, but the president called attention to the fact that some experience was necessary, and if I should, for any reason, have to give up the work during the ensuing year there would be no one broken in, so I advise nominating some one else as treasurer.

MR. CARLETON: As Mr. Merrifield said, it is best to keep new timber working in, and I don't know as it is really up to me to nominate, but my suggestion would be to nominate some new man, some good, trusty man, as treasurer to work up to take the place of Mr. Merrifield when we advance him the next step.

PRESIDENT CHAPIN: If I remember right our officers, according to our constitution, consist of a president, secretary, treasurer, two or more vice presidents, and an auditor; and that the president, secretary and treasurer constitute an executive committee. If we should combine the office

of secretary and treasurer it would produce on that committee only two or there might be a tie.

MR. SPEAR: I have an idea that it is just as well to scatter this work around, and I nominate Mr. Ormsbee for treasurer of this Association.

Nomination seconded, and carried, and Mr. Ormsbee declared elected as treasurer.

PRESIDENT CHAPIN: The next in order is some one to serve as auditor.

MR. SPEAR: I nominate Mr. P. B. B. Northrup, of St. Albans, to serve as auditor.

Nomination seconded, and carried, and Mr. Northrup declared elected.

PRESIDENT CHAPIN: It has been our custom to have two vice presidents. Whom will you nominate for first vice president?

MR. MERRIFIELD: I nominate for first vice president Mr. C. E. Martin, of Rochester.

Nomination seconded and carried, and Mr. Martin declared elected.

MR. CARLETON: For second vice president I nominate L. L. Story, of East Fairfield.

Nomination seconded and carried, and Mr. Story declared elected.

PRESIDENT CHAPIN: For a committee on resolutions the chair will appoint, A. J. Croft, Perry Chase and Martin Prindle.

OFFICERS FOR THE ENSUING YEAR.

President,	H. B. Chapin,	Middlesex.
1st Vice President,	C. E. Martin,	Rochester.
2nd Vice President,	L. L. Story,	E. Fairfield.
Secretary,	S. A. Merrifield,	Williamsville.
Treasurer,	C. O. Ormsbee,	Montpelier.
Auditor,	P. B. B. Northrup,	St. Albans.

MR. SPEAR: Before I have to go I was going to bring up one matter. That is the matter of labels for the use of members. The secretary wrote me a short time ago in regard to our supply, and I looked them over, and if we have as much of a demand as we did last spring we have not enough to go through the next season. There are about 50,000 left, but the number of sugar labels is small compared to the syrup, and whether it would be thought best to secure

another supply at this time, or what action you want to take, I bring this matter up for your consideration.

Another matter that has come up occasionally is the preparation of a smaller label to go on small packages. I don't know just how that could be arranged to use the same design and have it much smaller, and have it plain, but that might be worked out if it was thought best.

I received a letter a while ago from a concern in Springfield that arranged to put in a bid on getting our labels. I sent them samples of the labels, but have not had any estimate or any bid on the job as to what it would do.

PRESIDENT CHAPIN: I will say, in regard to labels, that there has been a call for them, and I think the most of us want them the same as we have been having them, and it will probably take 50,000 labels of both kinds to supply us; and according to vote taken at the business meeting last year they were to be fifty cents a hundred. They can be bought, according to our vote, at fifty cents a hundred for any quantity from fifty up to a thousand.

MR. PURRINGTON: Does that take into account the present prices of labels? That class of goods is way up, and I would advise before making prices to members that prices be secured.

MRS. DODD: I move we leave that to the secretary and treasurer.

MR. SPEAR: I would suggest that no orders for labels be accepted for less than one hundred: If we have to pay for setting up a man's name on fifty we lose money. It might be policy to get present prices on this class of work. We were very fortunate on our last order to get a very low price for the goods that we had. Seventy-five cents a thousand for lithographed label is not very high. It will cost us over a dollar a thousand to get the names put on.

We have about 50,000 that are paid for, but what the next will cost I don't know.

MR. CARLETON: I move that the matter be left with the executive committee to settle.

Motion seconded by Mr. Purrington, and carried.

MR. PURRINGTON: I want to make a few remarks on the matter of rotation of meetings. That thing has been thrashed out in the past two years and it has been discussed by various members and various branches of the Association, and personally I feel that it has not been wholly a success. We have had meetings in three sections of the state, and at only one of those have we had a satisfactory attendance. It seems almost a crime to ask anyone to prepare papers and deliver them to sparsely populated seats,

and ask the utensil makers to make a creditable exhibit for the number of people who have been at the meetings the last two years. The rotation of meetings is a fine idea, but if it does not get in touch with the sugar makers, the object of this Association is being lost. The object of this Association is to benefit the members and for the benefit of the sugar industry. Are we fulfilling the aims of this Association to its fullest extent? Personally I believe we are not, and if there is some way by which we can bring the Association into intimate touch with the active sugar makers it will be one of the greatest benefits the Association can confer upon the sugar makers of the state. I believe that there is a big opportunity which is being missed.

MRS. DODD: I feel the same as Mr. Purrington because I have been in the same boat. I would go to every session of the Association if it was anywhere near the center of the state, but to go clear across the state, it is not convenient for a great many of us. Isn't it so with a great many people?

PRESIDENT CHAPIN: The most successful meeting we had, in the last five or ten years, was the one at Montpelier three years ago.

MR. PURRINGTON: The Brattleboro meeting I should not consider satisfactory. The fact remains that we are not getting in touch with the bulk of the sugar makers. The ones we should reach are never here. It is the educated sugar maker that is here.

MR. CARLETON: How far will the uneducated sugar maker go if we won't have our meeting somewhere near him? Now in the southern part of the state I think you will find a good many. The state of Vermont furnishes \$500 for the good of the state, and are not the sugar makers in the southern part of the state entitled to their share of the benefit? I understand the position of which Mr. Purrington speaks. It is hard for the utensil fellows to get out and follow the meetings and have a small audience. They got a large crowd out when we met with the dairymen, but how many of these sugar makers were at the dairymen's show? Where was our membership at that time? We had thirty-six paid members five years ago. How many have we got to-day? We carried it to the places where they were.

PRESIDENT CHAPIN: We have somewhere in the neighborhood of 300 who paid last year, and on our report an enrollment of 460.

MR. CARLETON: The reason why we have done this is because the by-laws say that we shall hold it in various parts of the state. Another thing was, that around the center where we hold it we are apt to collect in 75 to 100 new members every time we change the location, and what makes the strength of an organization? Is it not the membership?

MR. PURRINGTON: It is the active membership who are participating in the activities of the Association. We have between 300 and 400 members, and I will venture to say that you have not reached 30% of them this year, that is, in active effort. I don't say that just a bulk of membership is the object of the Association; it is the membership that takes part in the proceedings of the Association and gets the benefit of it that is the part that counts.

MR. NORTHRUP: I move that the executive committee look up the northeastern section of the state and see if they can't find a good place to hold the meeting next year.

Motion seconded and carried.

MR. PURRINGTON: We had some excellent ideas put before us last evening, and ideas are all right, but if they are allowed to die they do us no good. There was proposed the formation of a sugar makers' trade journal. We have been looking for a medium of advertising; for a medium to advertise the products of the maple sugar maker; and when that proposition was proposed last night it hit me with more force than any other proposition that has been put before this Association during my connection with it. I believe from all standpoints that some such development of this Association would be of vast interest and benefit. In that way you can bring the work of the Association and interests of the Association before more sugar makers than you will ever get in any other way. I noticed in the Free Press an account of this Association meeting. You would find it if you happened to strike it,—it was about an inch long. If this Association, representing such large interests in this state, is not worthy of more than one inch space in one of the leading papers in the state, it is not worth continuing, and I believe the Association should take some means of investigating the possibility of starting some trade journal and of getting an able, efficient, up to date and live editor to devote his time to the advancement of the Association and its interests.

MR. ORMSBEE: Mr. Purrington's ideas are in line with my own, and I believe that a stock company could be organized by members of this Association to start a publication of

that kind, and if the paper was put around, and if we could get something of that kind, I will subscribe for \$100 worth of stock.

MR. PURRINGTON: The suggestion of Mr. Ormsbee may have some value, but I would point out with reference to that, that a private stock company might not have the force that the Association itself back of it would have. A private company must necessarily, have its own pocket book, in large measure, before its eye. The Association would be impartial, would advance only the affairs of the Association. There would be no strings to it, and I believe it would be of far greater benefit to have it under the direct auspices of the Association.

MR. ORMSBEE: I agree with Mr. Purrington, but I don't see how the Association could handle it.

MRS. DODD: Might I suggest that there are plenty of ways to handle that trade journal and still be within the law. If we could leave it to the executive committee just what the Association is able to do, then they can decide it by a ballot vote later on.

MR. PURRINGTON: I move that a committee be appointed to investigate this matter. I don't know whether it could have power to do anything without referring back to the organization, or not. If it could not there could be a special meeting of the Association appointed to consider it. I believe it is of sufficient importance to devote some time to doing constructive work in this Association. Getting together only once a year we listen to some fine papers and get some ideas, but we have not time to build up constructive work on these ideas, and by the time we get here next year it will be stale. I believe we are making a mistake by not giving more time to the business of this Association. Now is the time to do it and not let our enthusiasm get cooled by 365 days.

I move a committee be appointed to investigate this matter and if they can be given power to go ahead, I should favor giving them the power; and if they cannot, have it reported back to a special meeting of the Association.

Motion seconded.

PRESIDENT CHAPIN: It is moved and seconded that a committee be appointed to investigate the powers which they may have to start a trade journal to further the interests of the maple products industry. As many as so order will say aye. The ayes have it.

MR. PURRINGTON: And have the Chair appoint a committee.

PRESIDENT CHAPIN: I will appoint as a committee on trade journal Mr. Purrington, Mrs. Dodd and Mr. Story.

MR. CARLETON: Are we going to make any move towards having a committee look into organizing some means of handling the maple product, as a body, as I suggested? I just simply bring it up to see whether the people are going to take any action in regard to it because it seems to me one of the most important things that we have met here to discuss since we have arrived here.

MR. STORY: I was just talking with Mr. Tinkham, and he says if we don't get "on to our job" this year, somebody else will get "on to the job" and get the money. He says we have got to get a move on.

MR. CARLETON: I simply made the suggestion in my address, and I leave the rest to the sugar makers of Vermont, whether they want to take hold of it or not.

MR. NORTHRUP: I move that the president appoint a committee to act with the executive board to get up a stock corporation, or something else, to start this maple cream business for all it is worth.

MR. CARLETON: It should be in the hands of the Maple Sugar Makers' Association, then we are doing something, but you have got to have a committee to investigate this business and look into it.

MRS. DODD: From the legal, the market and business end.

MR. ORMSBEE: We will have to get a change in the charter to get that.

PRESIDENT CHAPIN: I think the best way to get at this is to have the members of this committee nominated.

MRS. DODD: I move that the president appoint a committee at some future time, not long in the future.

MR. CARLETON: Wouldn't it be best for the Sugar Makers to nominate the chairman of that board, because if the Sugar Makers do that themselves they are willing to co-operate with the man they choose, and not leave it to the president and then kick him for it afterwards.

MR. STORY: I nominate the president, Mr. Chapin, as chairman.

PRESIDENT CHAPIN: I would serve on that anyway.

MR. STORY: I nominate Mr. Carleton.

Nomination seconded.

PRESIDENT CHAPIN: Mr. Carleton is nominated, and his nomination seconded, to serve as a member to act with the regular executive committee of the Association.

Nomination and motion carried.

Mrs. Dodd was nominated as a second member, and nomination seconded and carried.

MR. CARLETON: I nominate Mr. L. L. Story.

Nomination seconded, and carried.

PRESIDENT CHAPIN: That completes that committee, and I hope they will be very active, and I pledge my co-operation to the extent of my ability.

I. L. NICHOLS: I used to be a member, but have not been for some time. I would like to know about this. If we make this a go we have got to have a lot of sugar to run it. Up our way as early as last August they were trying to contract their sugar at twelve cents, and probably 80% or 90% of the sugar made in that part of Franklin county is contracted for. If we are going to do this it is well to let the sugar makers know before they go any farther.

MR. CARLETON: I think no mention has been made thus far for people to join the Association. It would be as well to tell them that we want the new names and the old members to renew their membership. The members extend the invitation to all sugar makers to join the Sugar Makers' Association. One dollar is the annual fee.

Another matter suggested at our meeting last evening was that each member send in a gallon of syrup, and that constitute his membership, and become the property of the Association, which I think was a good suggestion. I would suggest that be worked out by the executive board, and what they feel that can give for this, and find an outlet to handle at the close; the more they handle of it, the more they interest in it by getting syrup and sugar to score.

I move that the matter be left with the executive committee.

Motion seconded and carried.

MR. PURRINGTON: When that was presented last evening the thought came to me that in connection with the membership and the journal, if that ever transpires, if they would send in one gallon of syrup and ten pounds of sugar to enter in the contest, that it would cover the expense of general membership and leave a balance in the treasury, if it would take care of expenses.

PRESIDENT CHAPIN: We will now have the report of the committee on resolutions.

Mr. Prindle read the following report:

Resolved, that the thanks of this Association are hereby extended to the hotels of the city of St. Albans, and to the Business and Professional Mens' Association, and the citizens of St. Albans for the use of the city hall for holding our meeting, and the very cordial welcome extended to us;

That the thanks of this Association are hereby tendered to the Secretary of State, Guy W. Bailey, and to the Commissioner of Agriculture, E. S. Brigham, for the many courtesies and the very efficient services rendered this Association during the past year in promoting and extending the work of better markets and an increased production of the maple sugar products;

That the thanks of the Association are hereby extended to the retiring president, A. A. Carleton, and to Secretary H. B. Chapin for their untiring efforts and labors in behalf of the Association.

A. J. CROFT,
MARTIN PRINDLE,
PERRY CHASE,

Committee on Resolutions.

MR. PURRINGTON: I move that the report be accepted and adopted.

Motion seconded and carried.

MR. NICHOLS: In the publicity work it seems to me that there ought to be in every post office in this state a notice of our next meeting. I know many in our vicinity, within a mile of me, did not know that this Association was to meet in St. Albans. They did not know in time to make their arrangements. They don't, but a few of them, take the daily papers. There ought to be something done a week or ten days before this meeting so that everyone would know the Sugar Makers were going to have a meeting.

PRESIDENT CHAPIN: I hope the secretary will take advantage of these remarks.

PRESIDENT CHAPIN: We will now proceed to the next thing on our program, which is a demonstration lecture by Miss Bessie M. Thayer, of the Domestic Science Department, Extension Service, of the University of Vermont.

DAINTY DISHES FROM MAPLE PRODUCTS.

MISS BESSIE M. THAYER, BURLINGTON.

Our ancestors found maple sugar the cheapest form of sugar obtainable. Even fifty years ago maple sugar was a staple article and cane sugar was a delicacy. Nowadays good maple sugar has become a luxury, selling from twelve to thirty cents a pound according to the method of treatment, I understand, and cane sugar fills the more plebian role in the culinary department of the town dweller, especially.

Maple products are valuable to the housewife chiefly for their fuel value and delicate flavor. The demand for high grade products exceeds the supply, therefore the economical housewife, by judicious husbanding of her maple supply, extends this delicious flavor throughout the year in icings, desserts, etc.

Sugar, starches and fats are heat and energy foods. All contain carbon, hydrogen and oxygen. The fats are the most concentrated and may be likened to hard stove wood. Starches digest more readily than fats, as a rule, while sugars are to the body like tinder. Alpine climbers make use of this principle by eating sweet chocolate, a form of sugar, when cold or tired.

A glance at the comparative fuel or calorie value of various sugars and starchy foods may be interesting. (See table—Average Composition of Sugars, Starches, etc.) The slightly lower calorie value of maple products is explained by their greater water content.

There are certain precautions necessary in the use of any sugar. Because of its flavor sugar, if eaten just before or at the beginning of a meal, may satisfy the appetite before sufficient food has been taken to supply the body needs, and it takes away the desire for the more bland and starchy foods. Hence, the body needs nourishment long before the next meal time, and a lunching habit is easily established, especially with children. For this reason some dietitians discourage the use of sugar on cereals.

Again, children need to be restrained from over indulgence, especially during the sugaring season, when the temptation is greatest, for excessive amounts of any sugar

quickly upset the digestive organs by causing irritation and fermentation. Also, experiments have shown that such excesses place undue strain upon the liver and kidneys, thus paving the way for future disease.

Average Composition of Sugars, Starches, etc.:

	Percent Water.	Percent Protein.	Percent Fat.	Percent Carbohy- drate.	Percent Ash.	Fuel Value per pound.
Maple Syrup	34.2	....	....	64.	....	1160
Maple Sugar	5.1	....	....	93.	....	1685
Honey	18.2	.4	....	81.2	.2	1480
Molasses	25.1	2.4	....	69.3	3.2	1300
Cane Sugar	....	....	....	100.	....	1814
Cornstarch	....	....	....	90.	....	1635
Tapioca	11.4	.4	.1	88.	.1	1608
Chocolate	5.9	12.9	48.7	30.3	2.2	2772
Cocoa	4.6	21.6	28.9	87.7	7.2	2256

MAPLE MOUSSE.

1 cup maple syrup, 1 pint heavy cream,
2 teaspoons gelatine, 1 tablespoon cold water.
2 eggs,

Dissolve gelatine in cold water; heat syrup to the boiling point and pour into the beaten eggs. Add gelatine and then add the stiffly beaten cream. Turn into a mould, pack in ice and let stand from three to four hours.

PIN WHEEL ROLLS.

2 cups flour, 2 tablespoons fat,
4 teaspoons baking powder, $\frac{3}{4}$ cup milk,
 $\frac{1}{2}$ teaspoon salt, Shaved maple sugar.

Make baking powder biscuit dough as usual. Roll to one inch thickness, spread with bits of butter and maple sugar. Nuts may be used if desired. Roll like a jelly roll. Cut off slices, place in a buttered tin and bake.

TWICE COOKED FROSTING.

1 cup maple sugar, 2 egg whites.
1-3 cup water,

Boil sugar and water to hard ball stage, about 240°. Pour slowly onto the stiffly beaten egg whites. Replace in the double boiler and stir until poached and a grating sound results. This frosting stays softer than the usual egg

variety, and can be kept several days in a tightly covered dish.

SANDWICHES.

Shaved maple sugar or maple cream are especially good for sandwich filling on nut or brown bread sandwiches. Below is a good rule for nut bread.

NUT BROWN BREAD.

1 cup graham flour,	1 cup white flour,
4 teaspoons baking powder,	1 teaspoon salt,
2 tablespoons sugar,	1 cup chopped nuts and raisins (or dates or figs.)
1 cup sweet milk,	

Bake one hour in a moderate oven.

The above recipes are merely typical of the numerous ways in which the delightful maple flavor may be made to enhance the year's diet.

PREMIUMS AWARDED.

SWEEPSTAKES CUP.

J. P. Spear.....West Newbury

CLASS A.

LARGEST AND BEST DISPLAY OF MAPLE SUGAR AND SYRUP BY PRODUCER.

		Premium
1st	C. H. Colvin, Rutland	\$25.00
2nd	E. P. Walbridge, Cabot	15.00
3rd	Eugene Perley & Son, Richford	10.00

CLASS B.

BEST ARTISTIC DISPLAY OF MAPLE GOODS.

		Premium
1st	J. P. Spear, West Newbury	\$25.00
2nd	Not awarded.	
3rd	O. H. Jackson, Westford	10.00

CLASS C.—CAKE SUGAR.

BEST MAPLE SUGAR CAKES NOT LESS THAN FIVE POUNDS.

		Premium
1st	D. E. Giddings, East Fairfield	\$ 4.00
2nd	Anna Colvin, Rutland	3.00
3rd	B. J. Walker, West Rutland	2.00
4th	Fred M. Walbridge, Cabot	1.00

CLASS D.—SYRUP.

MAPLE SYRUP,—SINGLE GALLON IN TIN OR GLASS.

Premium paid pro rata per point on all samples scoring 91
or over.

	Score
W. H. Collins, Strafford	95
C. W. Collins, Strafford	97
F. F. Spear, West Newbury	98½
Mrs. R. N. Spear, West Newbury	96½

H. J. Hewitt, Bristol	92
R. H. Rathbun, Bristol	91½
K. F. Hewes, S. Londonderry	94½
L. E. Cook, Cambridge	96½
A. Salmon, West Glover	96
Alvin Smith, Danby	98
G. H. Soule, Fairfield	98½
Dolphus Perry, Fairfield	97½
J. R. Witcher, Groton	94
H. B. Chapin, Middlesex	97
Mrs. E. P. Walbridge, Cabot	98
Eli H. Marcette, East Fairfield	96½
Edward Gravelin, Newport	98
Mrs. Kirk Bromley, Danby	97
Duane Bromley, Danby	95
K. M. Bromley, Danby	95
Martin Bromley, Danby	97
Mott Bromley, Danby	98
Delos Bromley, Danby	98
M. L. Hubbell, Enosburg Falls	95
C. E. Martin, Rochester	97½
R. J. Martin, Rochester	98
Mrs. Eli Marcette, East Fairfield	96½
A. F. Coville, Andover	98

CLASS E.

MAPLE SUGAR, 10 POUND PAIL OR TUB. PREMIUM PAID
PRO RATA PER POINT ON ALL SAMPLES SCORING 91
OR OVER.

	Score
Martin Prindle, St. Albans	93
H. W. Shattuck, Eden	97
N. K. Salmon, West Glover	95
J. Gould, Danby	98½
Maurice Walbridge, Cabot	95
Lewis Walker, West Rutland	95
Mrs. George Ladeau, St. Albans	95
Mrs. Martin Bromley, Danby	95
E. E. Perley, Richford	97

CLASS F.

MAPLE CREAM, NOT LESS THAN 5 PACKAGES.

	Score
L. L. Story, East Fairfield	93
M. E. Chapin, Middlesex	94
\$1.00 per point of the score above. 91 was paid on the above samples of syrup and sugar.	

HONORARY MEMBERS VERMONT MAPLE SUGAR MAKERS' ASSOCIATION.

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Nye, George W.....	St. Albans, Vt.		

R

O

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Orr, Don	Vershire, Vt.	Rathburn, R. H.,	
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Owen, M. J.	Barton, Vt.	Richardson, H. B.,	
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		Middlesex, Vt.	
		Rowe, E. L.....	Barnet, Vt.
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P

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Plastringer, Wallace A.,			
Northfield, Vt.			

S

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		Woodruff, W. S. & Son,	Cambridge, Vt.

Wright, Arthur,		Y
R. D. 2, Bradford, Vt.		
Wright, W. J.,	York, William E.,	
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Wyman, Newd W.,	Young, J. E. R.,	
Cambridgeport, Vt.	R. F. D. 4, Orleans, Vt.	

PROCEEDINGS
of the
Twenty-fifth Annual Meeting
of the
Vermont
Maple Sugar Makers' Association
AND FIRST ANNUAL MEETING
held in conjunction with the
Twenty-first Annual Meeting
of the
Vermont State Horticultural Society
AT BURLINGTON, VERMONT
December 4-7, 1917



ST. ALBANS, VT.
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1918

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The President, Secretary and Treasurer are ex officio members of all special committees.

TWENTY-FIFTH ANNUAL MEETING
OF THE
Vermont Maple Sugar Makers' Association
AND FIRST ANNUAL MEETING
HELD IN CONJUNCTION WITH THE
TWENTY-FIRST ANNUAL MEETING
OF THE
Vermont State Horticultural Society

Tuesday Evening Session, 8 P. M.

MR. H. B. CHAPIN, PRESIDENT, IN THE CHAIR.

President West, of the Vermont State Horticultural Society, introduced His Honor, Mayor Jackson, of Burlington.

ADDRESS OF WELCOME.

MAYOR J. HOLMES JACKSON, BURLINGTON.

Officers and Members of the Vermont State Horticultural Society and Vermont Maple Sugar Makers' Association:

It is my pleasant duty to extend to you all a warm welcome to our city. We are proud of the honor you have conferred on us by electing to hold your annual meeting here.

Burlington is the scene of many society gatherings but none more important than the societies represented here tonight who foster and build up Vermont's splendid resources through their researches and experiments. We shall need those resources developed to the fullest extent in the months ahead of us. Forestry must take an important place. We must cut wisely and plant wisely, if we are to depend largely on our wood supply as we are told. And in regard to sugar shortage, here again Vermont trees can come to the fore and give us the sweets we crave.

Vermont maple sugar is known from Maine to California for the pleasure it gives. Now it can become a food necessity as well as a confection. I fear some of the products bearing the title have never even had an ancestor in the Green Mountain State, but after all we should feel gratified that the word Vermont sells the goods, and pray that in some small measure at least the sugar may merit the honor.

The apple of Vermont is fast reaching the prominence it deserves. Each year more and more of the State's best fruit finds its market in the cities, and while it makes us here at home, if we wish to enjoy it, emulate the early bird and snatch, not the worm, but the apple, still it tends to the greater glorification of our sturdy little State.

But I am here to extend to you the hospitality of our city, not to talk to you of things you are all more familiar with than I am, and this greeting I give you most heartily. May your stay be so pleasant that you will wish to come to us again. I am sure each citizen will do his part to make it so.

RESPONSE TO ADDRESS OF WELCOME.

PRESIDENT, H. B. CHAPIN, MIDDLESEX.

Mr. Mayor, Ladies and Gentlemen:

It now falls on me to perform the pleasant duty of accepting the kind words of welcome, which the Mayor has so cordially extended to us, on behalf of the Vermont Maple Sugar Makers' Association.

Wherever you hear the name, Vermont immediately there is associated in the mind the subject of maple sweets. You may talk of honey nectar and ambrosia, but what can compare with the sweet smell of maple sugar and syrup when rightly made. Vermonters recall the maple sugar on the Vermont farms, and nothing brings up such pleasant recollections of those times as the days in the spring time when we shared this bounty of Nature so wisely stored up in the body of the maple tree. The maple tree is worthy of a place on the coat of arms beside the pine. It furnishes the shade of summer for man and beast, the beautiful tints of autumn which cover our hillsides with glory, and in the spring the sugar and syrup for many forms of sweets.

In closing I want to thank the citizens of Burlington, through their Mayor, for this cordial welcome.

Our first address of the evening will be by C. O. Ormsbee, of Montpelier.

WHAT IS THE MATTER WITH VERMONT MAPLE SUGAR?

BY C. O. ORMSBEE, MONTPELIER, VT.

The title to my paper tonight is a misnomer. It reads What is the Matter with Vermont Maple Sugar? It should read What is the Matter with the Vermont Maple Sugar Maker? Vermont maple sugar is all right in every way, shape and manner. But the Vermont maple sugar maker is a long way from being on his job. According to the reports of the listers as compiled by the Secretary of State, there were in the state of Vermont, in 1916, which is the latest year for which statistics are available, 9,570,570 maple trees available for the manufacture of maple sugar. Of these, only 5,508,656 were utilized. More than this; there were in the previous year 10,015,670 maple trees that were then available. This shows a decrease of 445,100 maple trees in one year. Now, how long can the maple sugar industry continue to exist at this rate of decrease in the maple trees? But never mind that part of it. I want to talk to you concerning another feature of the matter.

It is a little like going into ancient history to refer back to the Census report, but the figures compiled by that board in 1910, are the latest that cover the maple sugar industry for the entire maple sugar district. We have later figures for Vermont and Ohio, and from a comparison of those figures, I believe that the ratios found in the Census reports prevail at the present time, even though there may be some variations in the actual figures.

That report shows us that maple sugar was manufactured, commercially, in nineteen different states. And of these, the little bit of a state of Vermont produced twenty carloads more maple sugar than all the rest of the United States combined. And it stood third in the amount of maple syrup produced in the United States. It is true 70 per cent of its product was marketed as maple sugar, while only 30 per cent of the product of New York, and 2 per cent of that of Ohio was marketed in that form, the remainder being sold as maple syrup, but, figured on a maple sugar basis, allowing a gallon of syrup to be equivalent to eight pounds of sugar, even then, Vermont produced more

maple sugar than any other state except the great, overgrown state of New York.

And Vermont maple sugar is conceded to be of the highest standard of excellence, wherever maple sugar is known at all. Right over here in New Hampshire, in Concord and Manchester, I have seen placards in the windows of some of the grocery stores, advertising the fact that Vermont maple sugar was sold inside. And New Hampshire is a maple sugar state. I have seen similar signs in stores in Boston, in Worcester, in Springfield and in other cities in Massachusetts. Right across the lake similar signs may be seen next spring in many of the cities in New York, and that state has a greater out-put of maple products than Vermont. I have seen similar placards in cities in Michigan, in Ohio, in Illinois, and in cities in many of the states in the Mississippi valley, even in St. Louis. Once, in Canada, when riding in the cars west of Montreal, a newsboy went through the train crying; "Genuine Vermont maple sugar. The very best that can be made. Only five cents a cake". And the cakes would not weigh more than three ounces each. Once I had breakfast in the city of Garrett, in Ohio, and I had buckwheat griddle cakes and pure Vermont maple syrup. And on the bill of fare there were a few lines informing the public that that hotel served none but pure Vermont maple syrup. And right here in Burlington, the last time that this association held its meeting in this city, the Van Ness house, where we made our headquarters, served buckwheat cakes and just plain maple syrup.

And Vermont maple products retail for higher prices than those of any other state. Once in a grocery window in Grand Rapids, Michigan, I saw a number of pails marked maple sugar sixteen cents a pound. Right in the same window were several other pails marked Vermont maple sugar, eighteen cents a pound. And the advertisement of another grocer in the same city in one of the daily papers made a discrimination in favor of Vermont maple sugar. And I have seen an advertisement in one of the Chicago dailies, of a great department store, in which Vermont maple syrup was quoted way above Ohio maple syrup. And in a trade list of a great wholesale grocery firm in Chicago, which price-list was supposed to be seen only by the retail grocers, I have seen a wide discrimination made in favor of Vermont maple products as against the ordinary run of maple sugar. And right down here in Boston, S. S. Pierce has advertised maple syrup at one price and high grade Vermont maple syrup at a price a good deal higher. And

I have sold Vermont maple sugar in ten pound pails, to customers beyond the Mississippi river, at forty cents a pound. And I sold it at that price because they were perfectly willing to pay it. They were willing to pay it because the grocers in their cities charged them as much or more, for an article that they knew was maple sugar only in name, and, liking the flavor of the imitation, they wanted the genuine article.

And I bought that sugar of members of this Association at prices varying from twelve to sixteen cents a pound. And I bought at those prices, not because I was not willing to pay more, but because it was all that the sugar makers asked me to pay. They set the price themselves. And they set it at those ridiculously low figures just because those figures approximated the prices that they received years ago, before this Association, in conjunction with the Publicity Bureau, took the matter in hand and told the people what a nice article we had, and when inquiries came regarding that sugar, I put the price up to forty cents a pound. And I received an order from Missouri for one pail. And the next year I received an order from the same place for five pails. And the next year the orders were increased to fifteen pails. And last year there came a letter to the effect that none would be wanted because my customers had found that they could buy maple sugar of other members of the Vermont Maple Sugar Makers' Association for fifteen cents a pound. What do you think of that? It is a case of following the Golden Rule with a vengeance. You would like to buy maple sugar at an almighty low price, and so you offer it to your customers at less than half what it is worth.

Right over there on those tables are samples of the very best articles of maple products that it is possible to manufacture by any formula known to the maple sugar makers' art. You know it and are willing to swear to it. If all the maple sugar produced in the United States were equally divided among the inhabitants, there would be but a scant half pound for each person. It is impossible to produce enough maple sugar to supply one tenth part of what should be the normal demand. There are not enough maple trees in the whole world to do it. The people who use the most and demand the best are the people who are accustomed to pay from sixty cents to one dollar a pound for their chocolate drops, and they are able and willing to pay a corresponding price for their maple sugar. And they ought to pay it. It is not your place as sugar makers to

do the charitable act and sell it for barely the cost of manufacture, and often even less than that.

But let that pass. The point that I want to make is this:—While Vermont maple sugar is universally conceded to be the best that can be made; and while the demand for Vermont maple sugar is greater than for that made in any other state; and even much greater than the supply; and while the western consumer pays the retailer more for Vermont maple sugar than for that made in any other state. the Vermont farmer receives less per pound for his sugar than the sugar maker of any other state except two. These are Maryland and Michigan, respectively.

In proof of this I will submit the following table which is compiled and arranged from Table No. 57 of the United States Census for 1910. The original table merely gives the number of pounds of sugar, and the number of gallons of syrup made in each state, with the total value thereof at the farms. It thus becomes necessary to find the equivalent in sugar of the syrup manufactured. Assuming that a gallon of syrup is the equivalent of eight pounds of sugar—It may make more and it may make less, according to the temperature to which it is boiled,—we have a total production for the United States of 46,917,550 pounds with a value of \$5,177,809, or an average value of 11 cents per pound. The price of sugar is considerably higher at the present time, and so the actual figures will not hold good but the relative values are the same. And, omitting the smaller fractions, we have the following table.

Average price of maple sugar per pound, at the farm, in the different states.

In the United States as a whole, 11 cents. In Ct., 16: in Ill., 15: Ind., 13: Iowa, 15: Ky., 17: Maine, 14: Md., 8: Mass., 15: Mich., 9: Minn., 15: Mo., 15: N. H., 13: N. Y., 11: Ohio, a fraction over 10: Penn., 11: Vt., a fraction under 9: Va., 13: W. V., 12: Wis., 15.

In the original table, from which this table has been compiled, you will understand that merely the number of pounds of maple sugar, and the number of gallons of maple syrup were given, and this was followed by a statement of the total value in each state. It thus became necessary to calculate the sugar equivalent of the syrup, and add it to the amount of sugar.

But table 116 of the Census bureau gives the amount and farm values of sugar independently of the syrup, and from this table I have figured the average farm price of maple sugar in the different states as follows:—

In the United States, 10 cents; in Maine, 15: N. H., 11; Vt., 9; Mass., 14: Ct., 21: N. Y., 15½: N. J., 25: Pa., 9: Ohio, 11: Ind., 11: Ill., 21: Mich., 10: Wis., 16: Minn., 15: Ia., 20: Mo., 18: N. D., 20: S. D., 20: Md., 7: Va., 13: W. Va., 11: N. C., 16: Tenn., 20: Ark., 20½. From this you will see that the Vermont farmer sells his maple sugar independent of his syrup for less than the sugar maker of any other state except Pennsylvania and Maryland, and less than the average of the United States. Now let us see how it is in the case of maple syrup:—

Figuring in the same manner from table 117, we find that the average farm price of maple syrup throughout the United States is 97 cents. In Maine it is \$1.13: N. H., \$1.06: Vt., 88c: Mass., \$1.04: R. I., \$1.07: Ct., \$1.14: N. Y., 90c: N. J., \$1.49: Pa., 92c: O., 81c: Ind., \$1.08½: Ill., \$1.22: Mich., \$1.11: Wis., \$1.16½: Minn., \$1.23: Ia., \$1.20: Mo., \$1.15: N. D., \$2.00: Neb., 75c: Kan., \$1.41: Md., 80c: Va., \$1.03: W. Va., \$1.00: N. C., \$1.44: Ky., \$1.30: Tenn., \$1.21: Ark., 91c. From this table you will see that the Vermont farmer receives less for his maple syrup than the farmer of any other state except Ohio, Maryland, and Nebraska.

Now, What is the reason of this? And more than this, What is the remedy? I will make no comment. I have merely given you something to think about and will leave you to work out the problem for yourselves.

WEDNESDAY MORNING.

PRESIDENT CHAPIN:—The next speaker on our program needs no introduction to the sugar makers. Some twenty-five years ago there was a band of patriotic men in the state of Vermont who got together at Morrisville and made a successful attempt to rescue the maple sugar industry of the State of Vermont. Sugar was selling at five cents a pound loaded on the cars. People said it didn't pay to make sugar, and it didn't at those prices. We have with us to-day one of the survivors of that little band who with one exception has always attended the meetings of the Sugar Makers' Association, and that is Victor I. Spear of Randolph, who will now speak to us.

WHAT THE MAPLE SUGAR MARKET HAS DONE.

V. I. SPEAR, RANDOLPH.

Mr. President and Members of the Maple Sugar Makers' Association,—and the Vermont State Horticultural Society:—

It isn't exactly a new experience for me to have something to say before the sugar makers, especially of this Association. I don't think there have been very many meetings since that little organization that Mr. Chapin speaks of, twenty-five years ago at Morrisville, that I have not had something to say about some of the features or conditions of the maple sugar industry, and I feel as though I had thrashed the subject pretty thoroughly and that there is not anything that is very new that I can say to you here to-day, but still a good many of these old truths have to be hammered over and we have to have them continually brought before us that we may all follow the best practices and most practical methods in our work.

Your secretary has asked me to say something about the work of the Maple Sugar Makers' Market. I feel that there is little that I can say that will be new to many of you, as I have been telling the members of this Association each year at our annual meeting something about our work at Randolph. I shall probably repeat many things stated before and may not give you much strictly new information. If this proves to be true the only excuse I can offer at this time is that I have told you all there is to tell about our work at our previous meetings, and am therefore short of new material. Without saying what we have accomplished I will say that the Maple Sugar Market has tried to do the work for which it was organized. To what extent it has succeeded might be more fittingly told by some one other than myself.

The reason for organizing the Market was to provide a means of supplying customers with pure maple sugar and syrup. For several years after the Association was organized the only means of supplying customers was to have some producer ship the goods that were asked for. The

Association sent out large editions of the report of their annual meeting which included the name and post office address of each member of the Association. Persons receiving the report were asked to correspond with some member of the Association if pure maple goods were wanted. A good many orders were received and filled by means of this advertising, and I have no doubt many members of the Association are today selling most of their output to customers secured by this method. This method is ideal from the fact that the producer gets all there is from the sale of his goods and the consumer gets the benefit of buying direct without paying a commission to any middleman, so that both producer and consumer should be benefitted by the arrangement. It proved, however, that there were weak places in this arrangement, and the Association received a good many letters from intending purchasers saying they had written to several members of the Association for goods, but either got no replies or those written to had no goods to offer. Others wanted sugar and had found that the parties they had written to put up only syrup, or they would want syrup and only sugar was put up. Some wanted goods held and shipped in the fall, and in various respects it was found that there was need of a supply of goods at some point that could be drawn upon as wanted, and the product put up in such form as customers preferred. There were found to be other objections to the system of filling orders from the farms. There was a great lack of uniformity in the prices charged for the goods, and also a great difference in quality. The Maple Sugar Market was organized to meet some of the conditions stated and has been successful to some extent.

PLAN OF ORGANIZATION.

The plan proposed for organizing the Market was that members of the Association might send their sugar or syrup to the Market. There the goods would be graded for quality and credited to the producer. When the goods were sold the producer should receive the price his grade of goods sold for, less the expense of putting up and marketing. All goods were to be paid for in full at the close of the year's business with advances made before final settlement, as needed, and as funds were available for this purpose. This plan worked very well for about two years when it was found that some changes must be made in order to handle the business with any degree of success. We found that the average maple sugar maker did not

like to wait several months for the pay for his goods, and if required to do so, would look for a market where he would get his money when he delivered the goods. Our observation is that there is no season of the year when the average farmer has more urgent use for money than when the season of putting in his year's crops arrives. We also found that in order to retain whatever trade we had secured we must be sure of a supply of goods to fill the orders. Consignments were uncertain, and therefore we must make sure of having the goods to fill our orders. To meet these conditions we first arranged to advance money on consignments whenever requested, and make full settlement not later than July 1st on the basis of sales made up to that time. To meet the second condition we bought quite a quantity of our goods outright, paying market prices. We would be willing to retire from the buying field at any time, if we could be assured of a supply sufficient to supply our customers. In our direct buying we have been able to give the producers some advantage as most of our buying of syrup is done by correspondence and the commission of the local buyer is eliminated. In handling tub sugar local buyers are employed to secure it.

GRADING MAPLE SUGAR AND SYRUP.

The syrup handled by the Market is bought and sold on the basis of quality. We make three grades. The first, or Extra AA grade takes only the very best quality. Our second, or AA grade takes medium quality, and the third grade is the dark, late made goods. All syrup is tested both for density and quality and paid for according to test. When the market was first started there was very little if any grading of maple syrup, but the practice is now very general. We have always maintained that tub sugar should be bought on the basis of quality, but up to the present time very little of it is bought on this basis. It is rather difficult to accomplish much in this as long as so many of the customers who use tub sugar for flavoring purposes rather prefer the dark strong sugar to the better quality. Sugar sold to consumers, or the grocery trade, in bricks, or small tins is all graded by us on the same basis as the syrup. There is an increase each year in the demand for first quality goods and we hope the time is not distant when the person who makes strictly first quality goods will receive the increase in price to which he is entitled. Up to the present time it has not been possible to make the difference that should be made. Too many have the idea

yet that there is no difference in the quality of pure maple goods. If it is only pure the quality must be all right.

MARKETING THE PRODUCTS.

When the Market was organized it was decided to try and supply some of the trade of consumers by direct shipments, and this policy has been maintained up to the present time. We fill any order received, if we have the goods, whether it is for a single pound or a carload. This of course adds very much to the expense of doing business, but we have never been inclined to change this policy. Our product all goes either to consumers direct or to the retail trade. We do not sell through the jobbing or wholesale trade. We eliminate this item of expense in selling our goods and this helps to pay for the extra work in filling small orders. We now have customers in nearly or quite every state in the Union, and some of our consumer customers have had their supply from us nearly every year since we started in business. Most of our selling to the retail grocers is by correspondence. We pay very little for soliciting business.

Your secretary asked that I make a statement as to where our goods were marketed. He said he would not ask for the names and addresses of customers, but the locality. As I have stated, we sell some goods in nearly every state, but in some the quantity is small. In looking over our sales for the past season I find that approximately 25% is sold in New England. About the same amount in Greater New York, Washington and Philadelphia; 20% in Chicago and the Northwest; 10% on the Pacific coast and the balance is sold in the remaining territory.

PACKAGES.

Our packages for syrup in tin are the gallon, half gallon, quart and pint sizes. In glass we put up quarts, pints and half pints. Our sugar packages are ten, five, two and one pound cans or pails. In cake we make 2 ounce, 6 to the the pound, 4 ounce, 8 ounce, pounds and larger sizes if wanted. We find a steady increase in the demand for the smaller packages both from family and grocery trade. The half pint bottles which we would hardly think large enough for any customers, have been in great demand. During the past year we have used about 100 gross of these bottles. The sugar maker who is looking for trade with

consumers will find it to his advantage to supply the smaller packages when called for.

THE MARKET FOR MAPLE GOODS.

Formerly the demand for maple goods was limited to a few weeks in the spring, and grocers who wished to handle this product would secure their year's supply during April and May. This condition has changed, and to-day there is a very steady demand for maple goods through the year. We should probably except the months of July and August in which there is very little sale of this product. The demand for sweets seems to be governed largely by temperature. Cold weather seems to demand sweets. With us about one-fourth of our goods are sold in the spring or before the first of July. The balance is disposed of after the first of September. Most of the large grocery stores arrange to order about four weeks' supply and send an order each month. In order to hold this trade it is necessary to carry a stock of goods throughout the year. The present outlook for maple goods is very promising. We cannot expect the present unusual demand to continue as there will not be a permanent shortage of cane sugar, but we may reasonably expect that the demand and prices will remain better than usual while the present conditions continue. One of the greatest weaknesses of the maple sugar trade comes from a want of uniformity in quality of the product and in the prices charged for it. Nearly every other product has some degree of uniformity in price. Maple goods do not. If two neighbors buy their goods from two different parties there is likely to be quite a difference in the prices they pay as well as the quality they receive. I do not know how we can correct this and I merely state it as one of the difficulties that should be remedied. The Association has, I think, done a good deal in improving the quality and making it more uniform. In our buying we find much less light weight syrup than we did a few years ago, and there has been a decided improvement in quality. We have not, however, reached perfection, and there is plenty of work ahead in bringing the business to its best condition.

DISCUSSION.

MR. ORMSBEE:—What package do you like best to have it delivered to you in?

MR. SPEAR:—We are not particular about the sugar package. We buy most of our sugar put up in the large

packages. If the sugar is to be sold to the trade that is the better package. We buy a nice quality put up in tins, but that has to be sold during the spring months. Sugar in tin that is carried over through the hot weather is most certain to get in poor condition on top. If it is not cooked hard enough there will be a little syrup form, and a little evaporation, and the top of the pail will be white, and if that doesn't happen it will be honeycombed on top, so that sugar put in tin ought to be disposed of before the hot weather. That condition may be overcome to quite an extent if the sugar that is cooked quite hard and put in tins is left uncovered, so that there will be evaporation, and a little cheese cloth may be spread over the top to keep the dust out. When you confine sugar in tins without any chance for evaporation and no chance to soak into the side of the pail, as it does in wood, it will leave the package in poor condition.

MR. ORMSBEE:—In buying what allowance do you make for density? If boiled to 230° there will be more water than if it is boild to 245°.

MR. SPEAR:—We, as a rule, insist on the sugar being cooked hard enough so that it will stand up during the hot weather. It should be cooked to 235°.

MRS. DODD:—How can the consumers get the sugar out of the can?

MR. SPEAR:—That is their own lookout. I will say that there is a good demand through the spring for a soft sugar for cooking purposes, but the soft sugar, unless a good deal of care is taken with it, isn't a very good product to carry through hot weather.

MRS. DODD:—Have you ever carried any through in sealed glass?

MR. SPEAR:—Yes, but unless it is stirred to death there is pretty apt to be some syrup that will come to the top, and you have to break the grain up in order to keep it.

QUESTION:—Is this Market a private enterprise or agency?

MR. SPEAR:—It is a stock company that is organized and operated by some of the members of the Association. It is separate from the Association, and is a business proposition.

MR. WEST:—In what form do you buy your syrup?

MR. SPEAR:—Mostly put up in barrels. We furnish

our own storage, and the package we are now furnishing is the sealed barrel. It has proved very satisfactory.

MRS. DODD:—Do you have any trouble with crystallization in those sealed barrels?

MR. SPEAR:—We haven't had. If we did steam would have to take them out.

MR. ORMSBEE:—What are the best conditions for storage of sugar through the hot season?

MR. SPEAR:—The only thing that is necessary, in carrying syrup in good condition through the hot weather is that it be cooked to a proper density and then keep it dry. A good many make a mistake in putting the syrup down cellar where it is moist. If it is kept dry it doesn't matter much how high the temperature goes. We had an experience along that line, some twelve years ago, that was quite illuminating to me. We put 200 or 300 gallons of syrup in the attic of our plant. It was very nice syrup, and the attic of our plant is as hot a place during the summer as I was ever in. There is very little ventilation, and the roof is low, and it is suffocating to go up there to work. The last of that syrup remained up in that attic for seven or eight years before it was all gone, and we would take out some as we wanted it, and found the condition perfect, and the last we took out, two or three years ago in the winter, and made into small cakes, and the grain was as perfect as when it was first made. This simply went to convince me that we do not need to be afraid of hot conditions for maple syrup if it is properly put up and of proper density, but we do want to look out and see that it is not moist.

We cook all syrup over that we put into cans. Everything is cooked by meter and by thermometer. I trust a meter anywhere, but I do not trust a thermometer out of my sight. We keep thermometers in our kettles to indicate when it gets where it ought to be. The hydrometer is absolutely reliable. The thermometer may tell the truth, and it may not. It may tell the truth today and lie to you tomorrow. If you get a little nitrate on they cannot be depended on.

We have lots of goods brought to our market from farms where they claim to have cooked by a thermometer, and it either tested two or three degrees too light or too heavy, so I recommend to all sugar makers who are going to put up goods for consumers, never to do it unless you have a hydrometer to make the test before you can it and

never put up for the consumer direct from your evaporator. If you do you will make a mistake, for there is not one person in one hundred that can put up goods and have them even, and put from their evaporator into the syrup can. From the time you commence to draw off until you shut up the faucet, there is a change in the density. The proper way, if a person is going to can, is to get it as near as you can in your evaporator and settle it, or strain it, and then, before you can it, put it into a pan, heat it, and take your meter and test it and get it where you know it is absolutely right, then put it all up under the same test and same conditions.

MRS. DODD:—Doesn't that hurt the color of the syrup?

MR. SPEAR:—Every time we heat it, it makes it a little darker, but that does not damage it much.

QUESTION:—At what reading should the hydrometer be in hot syrup and cold syrup?

MR. SPEAR:—The hydrometer for eleven pound syrup should read 31 to 31 1-3 in boiling syrup, and about 35 1/2 in cold syrup. The reading of cold syrup depends on the temperature of the place where you are testing, but these I have given are on a room temperature of 60°. If below 60° the reading has to be varied a little. We can our syrup hot. Our rule is to put nothing in cans or bottles that is colder than the highest temperature that this package will ever be exposed to. Our reason for this is that after you put up your can of syrup you don't know where it is going or the conditions it will be under. If you put it up cold and fill your can full, say at a temperature of 40° or 60°, and then fill full, and that can be exposed to a temperature of 90° or 100° in shipping, the expansion has got to have room somewhere. If you are canning cold don't fill your cans quite full. We find it very satisfactory to commence our canning at about 160° and we calculate to complete and have the caps on before it gets below 100°.

QUESTION:—Wouldn't canning hot sterilize the package inside?

MR. SPEAR:—Yes, that is another advantage.

QUESTION:—Don't you also have to fill those cans that you fill at 160° and let them stand fifteen or twenty minutes and pour in more syrup?

MR. SPEAR:—Yes, they will bubble and won't fill quite full with the hot syrup.

QUESTION:—If your can only holds 11 pounds net of the standard syrup, the hot syrup has greater volume as it contracts, and in order to get in the syrup for the gallon you wouldn't want it at 160° would you?

MR. SPEAR:—It will get below that before you refill, it will go to nearly 100° before you get your caps on.

MRS. CHASE:—Was the syrup stored in your attic in tin or glass?

MR. SPEAR:—In gallon cans.

MR. ORMSBEE:—How about your temperature for storing ordinary tub sugar?

MR. SPEAR:—It should be fairly cool for sugar, if you can arrange it. The hot weather, of course, will cause some of it to waste, and if it is not cooked very hard there will be some leakage. The cooler and drier the place the better.

QUESTION:—Are any of the salts of tin, in tin cans, absorbed by the syrup as it stands in the tin?

MR. SPEAR:—I never have seen any. The syrup never takes off the tin. You might have a poor coating of tin on your iron and the tin would come off, but with a good coating of tin I think it will hold the syrup all right. There is not acid enough in the syrup to eat the tin.

MR. CHAPIN:—Wouldn't the thin syrup develop an acid in souring?

MR. SPEAR:—Yes.

MR. ORMSBEE:—When you get some sugar that develops a lot of molasses on the top of it, what can you do with that? Dump it into the kettle and cook it over? Or mix it with the other in recooking?

MR. SPEAR:—Where you get much syrup on the top of sugar the way we operate it,—I don't know as it is the best way,—is to keep that separate and put it in a little poorer grade of syrup that goes to confectioners.

QUESTION:—Would it mix with the other sugar?

MR. SPEAR:—Yes, if you put in enough of the other sugar, it will grain it.

MR. ORMSBEE:—When you get it where it crystallizes considerably, what use do you make of the crystals?

MR. SPEAR:—Put them into the kettles and let them thaw out. Reboil them. We don't get very many crystals. We get more grained sugar, perhaps 50 pounds in the bot-

tom of a barrel, where the syrup is a little heavy. The syrup that crystallizes has to be a pretty good quality of syrup. Take our very finest grade of syrup and you have got to be pretty careful not to get it below the minimum or you will get crystals in the bottom of your packages. We have had that trouble more or less. Take the very finest quality of syrup and it won't bear cooking quite so low as that that comes a little later. Probably on the syrup that metered 31 would be about as safe as it would be to run it. Then you might occasionally get a crystal. I had a little experience with some crystals a few years ago. A party had been a very constant customer for several years. He didn't take a great deal, but used to have three or four cases of syrup. Finally, several years ago, we sent him his ordinary order of syrup, and pretty soon I got a letter from him, and he said he had been buying syrup of us for several years and had entire confidence in the purity of the goods we had been sending him, but the last lot we had sent had changed his opinion, for he found in the bottom of the cans quite a large amount of rock candy. I tried to explain it, but he never ordered any more goods from us.

MR. ORMSBEE:—Do you have a market for those crystals as rock candy?

MR. SPEAR:—No, we never have had enough of them.

WEDNESDAY AFTERNOON.

PRESIDENT CHAPIN:—Among the signs of progress in Vermont in these later years, we notice the getting together of farmers to market their products co-operatively. The grading and packing of agricultural products is one branch of our industry that has been very much neglected in the past. Individuals cannot pack and grade uniformly because they do not have the large quantities to handle and operate with. Consequently it is much better for a body of farmers to get together and pool their products in order that they may properly pack and grade and sell to the best advantage, and we are fortunate in having with us at this session the manager of one of those co-operative enterprises who will talk to us on the exhibits at the Eastern States Exhibition in Springfield last fall, Mr. Hazen, Manager of the Farmers' Cooperative Exchange at Newport, Vt.

THE MAPLE SUGAR EXHIBIT AT SPRINGFIELD EXPOSITION.

L. F. HAZEN, MANAGER, FARMERS' COOPERATIVE EXCHANGE,
NEWPORT, VT.

I am very glad that the two societies here today have combined as I think their products go hand in hand. They look well together and they co-ordinate well.

I wonder how many attended this Eastern States Exhibition this fall,—only three or four. The rest of you ought to have been there, for you would have seen a great sight. Vermont had the best exhibit of any of the New England States. The New England Homestead and other New England papers admitted this. In the center of the space allotted was a huge bee hive surrounded with strained honey and honey in combs, and on each side, emerging from the rear, were great horns of plenty, and the vegetables and fruits were arranged so that it looked as though there was a stream of vegetables coming out from those horns of plenty all the time, and at the foot of this were all kinds of fruits and vegetables, from cranberries to potatoes.

There was also the butter and cheese exhibit, and the talc, marble and slate, which attracted considerable attention.

At the very end of the space was the maple sugar exhibit. This was arranged in terrace form in a very simple way, and had all the different forms of sugar and syrup, in bottles, tins and packages, from several different individuals. I was talking with one prominent maple sugar maker this morning and he didn't know there was any maple sugar sold at Springfield. You cannot imagine the great demand for pure maple sugar in the city unless you go there and try to sell it. There is a great opportunity for all sugar makers, and if they will only get the quality they can get the price.

The city people are hungry for good maple sugar. I am all the more convinced of this fact since spending a week at the Eastern States Exposition, in October. There were four or five persons in the Vermont booth and no two could

rest at the same time because of the demand for the pure maple sugar at the counter.

There were between two and three tons of sugar in different forms, sold and if twice that amount had been available it could have been disposed of readily. One form on sale was the maple cream and it was evident that there is an increasing demand for this. It was sold in the ten and sixteen ounce jars for twenty-five and thirty-five cents respectively. This cream is becoming popular because of its pleasing taste and flavor and its varied uses.

Then there were the products of the Maple Grove Candy Shop of St. Johnsbury. The owners are now manufacturing over one hundred assortments of the maple products with Jersey cream, chocolate and nuts. These were packed in boxes ranging in price from twenty cents to five dollars. This is a splendid assortment and there is such a variety that a sale is sure to be made to everyone that has a sweet tooth. There are many city people who do not hesitate to spend \$5.00 for a box of candy and we are all glad that Vermont people are able to study the demands of the public and then put out a product which is worth the price for which it is sold.

Besides the maple cream and these assorted candies the pure maple sugar in wafer and two ounce cakes were sold, both in bulk and packed in neat boxes. It is my impression that the sugar in this form sold the best of anything exhibited. I know that it kept two of us busy on just this form the first two days and we were completely sold out at three o'clock the second day. In this time about one half ton was sold or about fifteen hundred boxes. The people will buy this sugar if the quality is good. There are some who do not believe maple sugar is pure if it is light colored, but on the other hand I noticed that there were more who did know good sugar when they saw and tasted it and so there will be no reasonable excuse for anyone trying to peddle a dark sugar to the general public. The two ounce cakes sold for forty cents a pound and the wafers for thirty cents per half pound box. These could have been sold for more money but the general feeling among the exhibitors was to advertise the Maple Sugar Industry instead of trying to get rich.

This exhibit was in charge of the Vermont State Department of Agriculture with Mogens R. Tolstrup, Field Marketing Agent, as manager. Mr. Tolstrup has a wide acquaintance and has gained valuable experience in his work and travel which would directly benefit the Sugar

Makers if they would co-operate for a state-wide marketing system. This marketing system is no dream; it is something the Vermont Sugar Makers Association should start and see safely through. There is no question but that a co-operative marketing plan would be supported by a majority of our hard-working producers. Very few of them realize the extent of the Maple Sugar Trust which is operating in about every town where a maple tree stands. At present there is no particular incentive to the farmer to try and make a better quality product. Good sugar bushes are being cut away every year, probably never to return, simply because someone else has been getting the money for the farmers' labor instead of its being returned for investment in the sugar camp.

What is to be the remedy? First, it must be proven to the public that we hayseeds know how to make good quality maple products and that no black, dirty stuff be put on the market for the public to buy. A market will gradually be developed and you will be surprised to know how rapidly orders will increase, both in number and size. Then a big publicity campaign in several of the large cities will have to be launched, calling attention of the public that the pure maple sugar is so much healthier and more wholesome than many candies which are being purchased every day.

There are wonderful opportunities ahead for an organized group of Sugar Makers, the same as the New England Milk Producers' Association. It was organized on good strong principles and you are all aware of the results obtained. Doesn't it look reasonable that the farmers of New England are going to continue to support the Milk Producers' Association? If a marketing system for maple sugar is established on the same good sound basis why cannot the farmers get more for their maple products? Supposing the present handlers of maple sugar are getting in the neighborhood of 15% or approximately two cents a pound for buying and selling. Last year the Orleans County Farmers' Exchange was operated successfully at three per cent, considering all expenses and they did a \$100,000 business. Could a state wide maple market be operated on less than 15%? I believe so!

I have strayed away from my subject but I am interested in seeing all deserving producers get all that they deserve. The exhibit at Springfield was an eye-opener for many visitors and it was one of the best advertisements the sugar industry could have. Several individuals and a few dealers in sugar equipment provided material for the exhibit

and each and everyone is to be highly complimented upon the attractiveness and quality of their products.

Next year the members of this Sugar Makers' Association should help by making a quantity of maple sugar in different forms to exhibit and sell at Springfield. We as an Association should not forget to send a word of thanks to the directors of the Exposition and to the Commissioner of Agriculture, for the space allowed and the advertisement which Maple Sugar received.

DETECTION OF ADULTERATIONS IN MAPLE PRODUCTS.

C. H. JONES, CHEMIST, VT. EXPERIMENT STATION,
BURLINGTON.

By agreement with your President and Secretary my talk this afternoon on the subject of Detection of Adulterations in Maple Products will be as far from a technical discussion as possible. I shall try to make it clear to you just what our present methods for testing the purity of maple products are, and how results obtained by them are applied to distinguish between pure and adulterated samples.

It will be desirable at the outset for me to briefly recall to your mind the nature of maple sap, where it comes from and its general composition. With this information it will be easy for you to follow the subsequent statements dealing with maple syrup and sugar.

Maple sap as it comes from the maple tree is a dilute water solution of sugar, containing small amounts of soluble mineral salts, combined more or less completely, with an organic acid known as malic acid. In addition minute amounts of proteids or nitrogenous substances are present.

The sugar in the maple trees is manufactured each summer by the green leaves in sunlight, diluted with water and mineral salts secured from the ground through the roots, and distributed over the tree. The sugar formed early in the summer, say up to August, is largely used in the building of the annual ring. When this is accomplished, the amount formed later in the season is deposited as starch or held in solution in the wood tissues to be ready for quick transference to the leaf buds for their development in the spring. The sap secured by the ordinary tapping process is a part of that held in the wood tissues for the purpose just mentioned.

The sugar of maple sap is identical in composition with the ordinary cane or beet sugars of commerce and it is for this reason that up to a comparatively recent date no successful schemes for detecting the addition of cane sugar have been formulated. Realizing the impossibility of distinguishing between the sugars of the maple, cane and beet, certain chemists undertook to handle the matter from a

different angle and made extensive investigations as to the nature of the impurities present in the three sugars, maple, cane and beet, with the result that marked differences were observed. It is upon these differences that our present methods for detecting adulteration of maple products are based.

It should be remembered at the outset that maple sugar may be properly termed a crude product. By this is meant that it is never subjected to the refining processes employed in the preparation of granulated sugar. While it is entirely possible to so refine the maple sugar that a high grade of granulated or white sugar will result, the undesirability of such a procedure is obvious for it would result in the removal of the characteristic flavor to which maple products owe their present popularity.

When maple sap is boiled down to a syrup, not only does a simple evaporation of water occur, but, as all sugar makers know, a fine granular substance gradually settles to the bottom as the sugar cools. This is a combination of lime and malic acid known as "sugar sand" or "nitre".

Lime, potash and malic acid were held in solution in the sap, but as the water was driven off this power of holding salts in solution became lessened and the relatively insoluble combination of lime and malic acid, (sugar sand), settled out. Potash and malic acid remained in solution for they form a very soluble salt. Repeated trials have shown that all of the lime is not thrown out and the minimum left in solution when sap is boiled to a syrup density of 11 lbs. to the gallon has been carefully determined. The proportion of these materials, i. e., lime, potash and malic acid present in maple goods affords an excellent criterion of purity.

It would be out of place to elaborate in all their details the analytical processes resorted to by chemists to secure the data on which judgment as to purity can be based. For all essential purposes they may be divided into two classes: 1st, a determination of the mineral or ash constituents; 2nd, a determination of the malic acid present.

1. The ash constituents are obtained by heating the sample until the water is driven off, then burning the residue until the organic portion or sugar is destroyed and there remains a characteristic white ash consisting chiefly of the carbonates of lime and potash. This ash is weighed and treated with hot water which dissolves the soluble potash. The solution is then filtered and the insoluble portion consisting of carbonate of lime, which is held on the filter, is again burned and weighed. Thus we secure the

total ash and insoluble ash directly and the difference between the two is soluble ash. Thus,

Maple syrup contains:

Sugar, water, malic acid, mineral matter, i. e., lime potash

Burn, and there remains:

Carbonate of lime (insoluble in water) Weight = Total ash.

Carbonate of potash (soluble in water)

Dissolve in water, filter,

Insoluble portion (lime) Weight = Insoluble ash.

Total ash — Insoluble ash = Soluble ash.

2. In determining the malic acid which is normally combined with the mineral constituents, lime and potash, a portion of the syrup is weighed, a little water and calcium acetate added and the malic acid thrown out as malate of lime by the addition of alcohol. This malate of lime is of gray brown color, flocculent and when its amount has been determined by suitable procedures, the figure furnishes a valuable index as to purity.

Another shorter but less reliable test for purity consists in adding to the syrup a small amount of lead subacetate solution. The mixture is whirled in a suitable centrifuge and the volume of the precipitate noted.

Having briefly outlined the methods for testing the purity of maple products, we will direct our attention to results normally obtained by applying these methods and show how they are to be interpreted to distinguish between the pure and adulterated article.

The following table shows the ash and malic acid data on various sugars:

RESULTS EXPRESSED ON DRY BASIS:

	Total ash %	Insoluble ash %	Malic acid %
Minimum Standard.....	0.77	0.23	0.60
1. Vt. Maple Syrup.....	0.79	0.25	0.61
2. Vt. ".....	0.85	0.42	0.71
3. Cane Sugar (gran.).....	0.05	.00	.00
4. Brown Sugar (light).....	1.06	0.06	trace
5. Brown Sugar (dark).....	0.33	0.08	0.06
6. Maple and Cane.....	0.52	0.27	0.48
7. Cane and Maple.....	0.24	0.04	0.17
8. Brown Sugar and Maple.....	0.85	0.14	0.22

Pure maple samples generally show results above the minimum stated in the first line of the table. Cane sugar

No. 3 is practically free from ash and malic acid. Its presence is indicated in sample No. 6 by a drop in total ash and malic acid while a still larger admixture of cane to maple sugar is seen in sample No. 7 where all the figures are far below standard. The mixture of maple with a brown sugar containing a high total ash is seen in sample No. 8, which might have resulted from the addition of a brown sugar similar to No. 4. The nature of the mixture is indicated by the low insoluble ash and malic acid.

In conclusion I wish to call your attention to the important matter of securing representative samples should occasion ever require that an analysis be made. It is not enough to knock off a little chip of sugar from the first tub or cake that you see. Maple sugar is variable in its composition and it seems but fair that if the chemist is expected to make a long tedious analysis, the sample that he is working on should at least be taken with suitable care and be of sufficient size to warrant the labor put upon its analysis. A pint of syrup or one pound of the sugar mixture should be furnished.

DISCUSSION.

QUESTION:—What per cent of granulated sugar do you think could be put in and not found out?

PROF. JONES:—In some cases you might get by on a ten per cent addition. The popular notion seems to be that a small addition of granulated sugar will improve the color of the dark grades of maple. Such is not the case. As much as 50% can be added before the color is changed to any extent.

MRS. DODD:—Does the quantity of ash vary with the different kinds of soil that maple trees grow on?

PROF. JONES:—Answering in a general way, I should say yes. The ash of maple sugar is mainly composed of lime and potash. While the quantity of both will vary somewhat with the location and season, investigation has shown that a certain minimum amount is always present even in the best quality syrup. A part of the lime salts settle as the syrup is concentrated and are removed by filtration or sedimentation. The potash forms soluble salts that are not removed by filtration. When tub sugar drains, a considerable portion of these potash salts are carried away in the liquid portion, which, of course, leaves a larger proportion of lime salts in the ash of the drained sugar.

COMMENT:—On our side of the State we find a great difference in neighboring sugar places not very far apart.

PROF. JONES:—I don't think the difference you mention would be reflected to any great extent in the ash. If you refer to quality as denoted by flavor and color, variations due to methods of handling the sap may be very noticeable in the finished product.

QUESTION:—How would this deposit be referred to, as sugar sand?

PROF. JONES:—The chemical name is malate of lime, but it is commonly referred to as sugar sand or niter. The term sugar sand can easily be accounted for but why anyone called it niter is beyond me.

QUESTION:—Has there ever been any use found for this malate of lime?

PROF. JONES:—I have heard of its being used for scouring purposes and also as a source of malic acid. I am somewhat skeptical about the possibility of using it on a large scale because the supply is so small in each place that the expense of collecting it at any one point would be excessive.

MR. ORMSBEE:—Would't it be possible to add a little malic acid or malate of lime and make a compound that would defy detection?

PROF. JONES:—I suppose it might be possible to make an artificial ash. I doubt very much its being successfully done commercially.

QUESTION:—How high a percentage of mineral matter have you found in maple syrup?

PROF. JONES:—On a sample made during the last of the season, if it is dark colored and not boiled down below eleven pounds to the gallon, you would probably find about eight tenths of one per cent. The maximum amount would be set at one and one-half per cent. On carefully made syrups that have been freed from sugar sand, the range is narrowed and we find from one-half to eight tenths of one per cent present.

QUESTION:—What is the flavoring that is added to this so-called maple sugar you have shown us, that is not maple sugar?

PROF. JONES:—There is no particular flavor. The sugar is characterized by lack of flavor. Maple sugar, when

it is first made, is one thing, but if you store it for a year, it will not have the same rich aroma it had on the start. Purity is established by other means than by flavor.

QUESTION:—What advantage would it be to shade trees if they were tapped? Could people be criticised for tapping shade trees?

QUESTION:—If the trees were big enough I don't think it would do much damage to tap them. I wouldn't, however, hang more than one bucket on a tree. It is quite probable that conditions for moisture and plant food consumption are not as good with the shade trees as with maple trees in the forest. For this reason it might be advisable not to tap the former every year.

QUESTION:—Can you tell us what it costs to produce maple sugar?

PROF. JONES:—It costs a good deal more than the ordinary man thinks it does and taken all around it is a pretty expensive job. We had a student a few years ago that made a careful summary of quite a number of orchards. This information has been published in Bulletin No. 203. I cannot give the figures off-hand. Some of the reports of your association contain discussions on this topic.

QUESTION:—Is there very much adulteration in Vermont?

PROF. JONES:—No, I don't think there is at the present time, nor do I think there has been for six or eight years past.

WEDNESDAY EVENING.

PRESIDENT CHAPIN:—We are very fortunate in having with us this evening one of our Canadian neighbors, a man who knows the maple sugar business from A to Z, and an ex-president of the Canadian Maple Sugar Co-operative Growers' Association, Mr. M. F. Goddard of Waterloo, Canada.

THE SPOUT SYSTEM OF GATHERING SAP.

MR. M. F. GODDARD, WATERLOO, CANADA.

Mr. President and Members of the Vermont Maple Sugar Makers' Association, and Vermont State Horticultural Society:

It affords me great pleasure to come down here and take part, in my small way, in the proceedings of your annual meetings. I have been down here several times. In fact our society that we organized in Canada was the fruit of Mr. Grimm and myself coming here. We decided we should have a similar organization in Canada, and we went to work and succeeded in organizing a sugar association that has been a great help to the maple sugar industry of Canada.

The Canadian Forestry Association is the authority for the statement that 50% of the land in Canada is only fit to raise tree crops, and after the first settlers have cut off the virgin crop of timber it is left to grow up again. As it takes about 25 or 30 years to grow a maple, ready to produce, and 260 years to grow a pine tree to the size profitable for lumber, you will see that the settler has to move to other parts, and consequently the land grows up a new crop of timber in which the maple usually predominates.

There are at least 55,000 sugar makers in Canada, and I venture to assert that not more than one-half of the sugar and syrup is produced that could be. The average number of trees tapped by each maker is about 1000. The early methods of making maple products were not very profitable, as using the big iron kettle, tapping with an axe, and gathering the sap by hand from wooden troughs and traveling on snow-shoes, on account of the great depth of snow, were all slow processes.

Next came the flat pans made of Russia iron, which, if the sweet sap or syrup was left in the pan over night, would cause the syrup to become very dark. At this stage the wooden and tin spouts were used in tapping the trees, also wooden vats and gathering tubs were used. Then came the Canada heater and plain tin pans, which produced a clearer syrup and a better sugar.

As in every other industry, there were those who were not satisfied and who began to experiment by having plain pans made with partitions across them, and running the sap in at one end and taking the syrup out at the other. These pans were called evaporators, and with them came the galvanized gathering tubs and storage tanks, also the metal spouts. Today there are many different evaporators, many different spouts used, also gathering and storage tanks, which bring about the same results. Many sugar makers use covers for their buckets, which tend to make a better article as it keeps the rain from the sap.

I have not used the spouting system as used in Canada by a few of the good makers. This system has its advantages as there are many sugar places where it is almost impossible to use horses and sleds. The problem of gathering maple sap has been a troublesome one, and all methods are at times more or less unsatisfactory owing to conditions of travel in the heavy snow in the sugar bush. In order to lessen the amount of travel, it is possible to install a temporary system of piping so that when the sap has been gathered from the individual trees it can be poured into a tub called a hopper, which is connected with the pipe line, and so run directly into the storage tank in the sugar cabin. It is quite obvious that not all sugar bushes are placed so as to be suitable for this method. If the sugar bush happens to be on a gentle sloping hillside, and the cabin has been placed at the lower side of this slope, it is probably suitable for this piping method. To get the best results a 10% slope in the piping should be obtained if possible, although it is practicable to use as low as a 6% slope. It is always well, in laying out a course of pipe line, to endeavor to obtain as even and regular a slope as possible. This will overcome the tendency to leak at the joints which would naturally follow the overfilling of the piping in low places.

The most satisfactory piping seems to be the 2" galvanized sheet iron piping made in 10 foot lengths. It is not necessary to solder the seam if it is well pressed, but both ends should be riveted so they will not stretch. One end should be made smaller for a distance of about 2", so that it will fit into the end of the neighboring tube for the distance of 2", making the joints watertight, which will be quite satisfactory, if the piping is never more than one-half filled with sap, and providing that the slope of the piping is enough to allow of a steady flow of the sap. In order to provide for this even slope and retain the piping firmly in position, the pipe line should be installed in

the warm weather, and carefully planned according to certain principles.

The best method so far evolved is undoubtedly one in which permanent cedar posts are securely planted in good line, ten feet apart. If these posts are merely stuck into the ground they will be shifted by the frost so as to cause irregularities in the pipe line. Brackets of wood should be arranged along one side of this line of posts so as to support and hold the pipe line firmly in position. These brackets may be made from triangular pieces of 2 x 4 scantlings. It is an easy matter to bore a two inch auger hole through the scantlings before sawing off the triangular pieces to from the bracket. With a saw cut through this auger hole, a half circle is left on the upper surface of the bracket ready to receive the piping. By nailing a second triangular piece with a half circle in it above this supporting bracket, the piping is held firmly in position.

Experiments have been made by supporting the pipe line to an overhead wire, but this is very unstable, as the wind sways the pipe line, causing it to become loose at the joints, and when the weight of the sap passes through it, it is sure to sag in places, resulting in a bad leak.

Hoppers should be attached about every fifty yards along this pipe line, so they may be convenient for the man who is gathering to empty his load of sap without traveling too far. Branch lines are easily arranged so that they are convenient and increase the area surface by the main trunk pipe lines.

Frequently a plateau near the top of a hill is not satisfactory for piping, and sap is more economically gathered by a team with the usual gathering tank. Here it is well to install a hopper with a capacity of about two barrels, so that the gathering tank may be emptied into it without detaining the team. The other hoppers should be of about 20 quart capacity, taking a little more than a gathering pail. These hoppers are probably best connected with a pipe line, by means of well fitted brass connections, so that the hopper fits down on the brass connections, which have been soldered to the piping, and is retained there merely by friction. This hopper must of course be supported on a post or platform, so as not to displace the pipe line when a pail full of sap is emptied into it. A short section of about two feet of pipe line is used to receive the brass connection, and this is inserted wherever desired between the regular lengths of piping. As it is not practical to change the hopper station, it is necessary to fit the piping. Once this piping has been fitted, it should be numbered in

some way so that refitting will be obviated from year to year. Once the posts have been properly installed and the piping properly fitted and numbered, it will not be an arduous task to replace it each season. Each hopper should have its cover, and if possible a wire strainer to prevent ice from clogging the pipe line. The piping should always be taken down at the close of the season and carefully washed, as any fouling would infect the sap the following season, and so lower the quality of syrup.

This system has worked on the whole very satisfactorily in one sugar bush where 6,600 feet of piping is in use at present. One main trunk line of piping is 400 yards long, and another is a little over 500 yards long. Sometimes ice collects in the pipe owing to a sudden change in the temperature, but with a 10% slope the stream is rapid enough to keep the channel clear, as a rule. This pipe line serves about 5,000 trees, and on several occasions upwards of 150 barrels of sap have been conducted to the storage tank in one day.

Regarding the cost of this system it is almost impossible to give a price as material and labor are advancing all the time, but my impression is it would be much more costly than using horses and gathering tanks.

Regarding the quality of goods I do not think, on the whole make of the season, there would be an improvement.

I thank you for your kind attention, and will now resume my seat.

(NOTE:—There is evidently an error in the statistics quoted in the third paragraph. 55,000 sugar makers, tapping an average of 1,000 trees gives a total of 55,000,000 trees tapped. The total out-put of sugar, including the sugar equivalent of the syrup, according to the latest figures available, is 27,000,000 pounds. This gives an average yield per tree of a trifle less than nine ounces.

C. O. ORMSBEE, Sec.)

WHERE THE MAPLE TREE GETS ITS SUGAR.

C. O. ORMSBEE, MONTPELIER.

There are things so hard to understand
They block the wisest brain;
There are things you can't get through your head
At any cost or pain.

Hugh Miller, who is often called the father of the science of geology, was once examining a stone in which were a large number of fossil shells, and puzzling his brain over the then unsolved problem of how the shells came to be so firmly imbedded in the solid rock. And he asked a Scottish quarrymen his opinion in regard to the problem. And the honest old quarryman replied, "When God made the rocks He put the shells into them and fixed them just as they be and that is all there is about it." And all the study that scientists have given the subject since that time have resulted in a no more lucid explanation.

The same answer is equally applicable to the question now under discussion. In fact, in the light of all present knowledge, it is the only answer that can be given, and, were we willing to accept it, a vast amount of brain energy might be conserved. But, leaving this point, the question naturally turns to the secondary problem of How does He do it?

Various people, and at various times have given us various theories and ideas along this line, many of which seemed plausible, and, for a time, were accepted as the true solution of the problem. But, as our knowledge of the matter increased through more definite and accurate study, all of them have been proven to be wholly wrong and misleading, except so far as they coincide with what I shall tell you. And right here I want to preface my remarks with the statement, that future investigation may prove that all that we think that we now know of the subject is wrong, and that we really know nothing that relates to the solution of the problem. Nevertheless, I shall give you the results of the best thought at the present time in relation to this problem.

The trunk of every tree consists of three distinct parts:—viz. The bark, or outer covering, the sap wood, other-

wise known as the white, or light-colored wood, and technically known as alburnum, and the heartwood, which is of a darker color, and is technically known as duramen. There is also the pith, around which the wood is deposited in concentric layers, and the so-called cambium layer, of which I shall speak more fully a little later. Located near the ends of the smallest of the rootlets of every tree, are numerous minute microscopical appendages termed "root-hairs". These root-hairs abstract moisture from the soil, apparently by suction, and convey it to the rootlets. Thence it is forced into the larger roots, into the sap-wood, up through the sap-wood, into the branches and twigs, and, finally, into and through the leaves. This moisture consists of an extremely weak solution of lime, potash, phosphorous and the various minor mineral elements, all of which unite more or less firmly to form the ashes when the substance of the tree is burned. Technically, it is known as "crude sap", in distinction from the "elaborated sap", of which I shall speak a little later. And these little root-hairs seem to be endowed with a certain amount of intelligence and independent action, for, if the moisture contains a greater percentage of mineral matter than is relished by the tree, they will, to a certain extent, separate and reject the surplus. On the other hand, if the solution is too weak, they will reject a portion of the moisture and retain the remainder, to a certain, but varying extent, until that retained has accumulated enough of the missing elements to give the solution approximately the required strength. I say approximately, because not only the amount of mineral matter in a given amount of wood varies, but the proportions of the different elements also vary. But, in general, it is said that the total quantity of mineral matter should amount to about one part in one thousand parts of water.

Now, what power is it that abstracts this moisture from what seems to be a perfectly dry soil, and forces it through openings, and pores and channels so minute, that, were a million holes as large as the pores of a root-hair to be punched through a sap tub, the serviceability of that tub would not be impaired in the least? In answer to this question I can only say that I do not know anything about it, and neither does any one else. Agassiz was fond of making the remark that the most learned specialist in any branch of natural science, might be forced to admit his ignorance of the elements of his favorite topic, if three pertinent questions were asked. In this case one is sufficient. It was formerly believed that this force was the suction produced by the unfolding of the buds and the

growth of and transpiration from the leaves thus producing a vacuum. And I once listened for an entire evening to a lecture given by the most noted scientist of Vermont, who, had he been located near the city of Boston, instead of in the little obscure village of Lunenburg, would have been classed among the most noted scientists of the world, while he endeavored to demonstrate this theory. And, by the way, before he died, he renounced it absolutely in favor of another which is now rejected. Assuming that the suction thus produced would be sufficient to force or draw the moisture through those minute channels, we can conceive of no form of a suction pump that will produce a continuous flow of liquid without the aid of some force pressing from below. More than this there is no form of suction that can raise liquids higher than to a theoretical height of thirty-two, or a practical height of more than twenty-six or twenty-seven feet. Therefore, in spite of the most subtle reasoning, this theory must fall to the ground.

It is assumed that it is the force of suction that abstracts the moisture from the soil, and transfers it to the roots, because, in the light of all present knowledge, we can conceive of no other force that could operate in this manner. But we are in profound ignorance of the cause which produces the suction. It is also assumed that the power which forces the crude sap to ascend, must be a strong pressure applied at or very near the smaller rootlets, because we can conceive of no other power that could produce this result. But we are in total ignorance of what that force really is, or how it can be applied.

It has been said that the force is that known as capillary attraction. Capillary attraction may, perhaps, bring the particles of moisture in contact with the root-hairs, but, even under the most favorable conditions, it cannot raise liquids to a height of more than twelve to sixteen feet. More than this, were the assumption correct, we are as much in the dark as before, for we have no conception of the power that is behind capillary attraction, except that it is some force, which, under certain conditions, causes liquids to act in a manner contrary to the way that we should expect them to act.

It has also been assumed that the agent of motion is osmosis, or osmotic force. Osmosis is a force which acts a little differently in many respects from capillary attraction, but it can raise liquids no higher, and we are even more in the dark in regard to its origin. So, if we assume that osmosis is the power behind the throne, we merely give the force a name, and nothing more. And so

we are compelled to fall back on the theory of root-pressure, which prevails at the present time. And here we have merely given the force another name and nothing more. For, in spite of all that has been written in support of the theory of root-pressure, when we come to study and analyze the chapters devoted to that subject, we find that they consist of words and disconnected observations and experiments that have little or no bearing upon the matter. We have not the slightest conception of what root-pressure is, or how it can be applied, and we are as much in the dark as ever. And lastly, though I believe not the last in chronological order, we have the theory that the sap is carried up by the motion of the protoplasm within the cells of the wood. And when we begin to study protoplasm we get way beyond our depth immediately. Since the days of Huxley and Darwin no man has lived who has had a mind sufficiently powerful to grapple with protoplasm, and even they died before they had conquered it. But there is one thing that we do know, and that is that this force, whatever it may be, is most intimately associated with the life and health and strength and vigor of the tree, and when one declines, the other declines in exact proportion, and, when one becomes extinct, the other becomes extinct, also. Therefore, we may safely say that this unknown force, acting in an unknown manner, is an integral part of the unknown principle which we call life.

But leaving this abstruse subject, we will return to a discussion of the sap. I have said that this crude sap is forced through the leaves. During this passage, it loses by transpiration, which is merely a high-toned word meaning evaporation, a very large percentage of its moisture and becomes greatly reduced in bulk and greatly condensed so far as the percentage of the mineral substances contained in it are concerned. I have seen it stated that the proportion is at the ratio of one part retained to seven hundred parts transpired. I don't know whether this is correct or not, but, assuming that the crude sap originally contained but one part of mineral matter to one thousand parts of water, it would seem that the estimate is somewhat exaggerated. But let that pass. To a certain extent the moisture is also broken up into its original elements of oxygen and hydrogen. A portion of the oxygen escapes into the atmosphere and replenishes and purifies the air we breathe, and a portion of the hydrogen also escapes and unites with a portion of the nitrogen of the air, thus forming ammonia,

which is precipitated to the ground during storms of rain or snow, and thus becomes a fertilizer.

And air is also forced through the leaves. Of the nature of the agency which is instrumental in doing this, we are even more ignorant than of that which raises the crude sap from the ground. We only know of the operation. But during its passage the air loses the carbonic acid, or, as students are now taught to say, carbon di-oxide, which is intermixed with it, and emerges as the purest kind of air. And the carbonic acid is, by some unknown agency, broken into its original elements of carbon and oxygen, and united with the hydrogen to which reference has been made, thus forming starch. This starch is almost immediately transformed into other more soluble substances, closely related chemically, but differing widely in general appearance, according to the nature and species of the tree. In the spruce it is transformed into gum; in the pine into pitch; in the birch into glucose, and in the maple into sugar. In this form it is taken into solution by the sap which is hereafter known as elaborated sap and, by a double circulation, of the nature of which we know nothing, it is forced back into the body of the tree. From here, so much as is needed in the growth of the tree is carried to those parts where new tissue is being made, and the remainder, of which there is a great surplus, is stored in the trunk of the tree for future use. In the maple it is stored almost wholly in the sap-wood, but in the elm it appears to be stored in the heart-wood and in the pines in both. Sometimes it is stored in the form of sugar and sometimes as starch, and the tree seems to have the power to change it from one to the other according to its own pleasure or convenience. But we will try and not lose ourselves in the labyrinth of these details.

This elaborated sap that is stored in the trunk of the tree remains pretty quiet during the winter, but, along towards spring, it begins to get into motion. Some of it finds its way down into the roots and stimulates them into renewed action, and some of it is forced to the extremities of the twigs and into the leaf buds, causing them to swell and develop into leaves, and it ultimately produces the terminal growth of the tree. Thus far the sap has followed along longitudinal channels. But, when the growth of the leaves begins, another unknown influence makes its appearance, and a portion of this elaborated sap is forced transversely through the cell walls to the surface of the wood, where it separates the bark from the wood, forces it away and, becoming a somewhat jelly-like substance, occupies the space thus made. According to the popular opinion

it is this portion of the tree that is termed the cambium layer. But popular opinion is in error for this is not the cambium layer. It is merely the embryotic form of the present season's body growth of the tree. The cambium layer is the glossy lining of the bark, as thin as a layer of varnish, and seems to act as a coating of varnish might act. That is, it checks the further progress of the sap, prevents it from entering the bark, and holds it firmly against the wood, into which it is eventually transformed, thus forming one more concentric layer of wood, which is firmly cemented to the layer that was formed the preceding year. And there is always a scar, in the form of a thin ring encircling the tree. And, by counting these rings one may ascertain the exact age of the tree. It has sometimes been supposed that the channels through which the sap ascends and descends are in this so-called cambium layer. But they are not. They are in the sap-wood. Were they in this layer it would be necessary, when tapping a tree, to bore only to this layer, instead of into the wood. More than this, the layer does not exist during the so-called sugar season. It has also been supposed that the channels are located in these rings. But they are not. They are located in the layers of wood between the rings.

If I were speaking to a strictly scientific audience, I might use different terms, but, generally speaking, the walls of these channels extend in straight, longitudinal lines, parallel to each other, and to the pith, or true heart of the tree, thus forming the fibers or grain of the tree. Sometimes, however, while pursuing a general upright course, they work in and out, alternately towards the heart and the bark of the tree, thus forming what is known as "laced" wood, highly prized by certain of the wood-working industries, and heartily cursed by the wood chopper. Sometimes, this lacing seems to be more or less arrested in its development, resulting in little dots, and we have the "bird's-eye" maple, so highly prized in cabinet work that it often sells as high as one hundred dollars per thousand feet. Sometimes they zig-zag, back and forth, to the right and left, somewhat after the fashion of a rail fence, and we have the "curled" maple, scarcely less valuable than the preceding. And sometimes the fibers extend spirally around the tree, and we have the cross-grained maple cursed by every one who manipulates it. But what is most singular of all, is the fact, that, occasionally, when the fibers change their nature, from sap-wood to heart-wood, they change the line of direction, also, and it is not uncommon for the wood

chopper to find a tree in which the fibers of the sap-wood extend in a line parallel with the trunk, while those of the heart-wood extend more or less spirally around the tree. And occasionally a tree is found in which the fibers of the sap-wood extend spirally in one direction and those of the heart-wood extend spirally in the opposite direction. This peculiarity is found much more frequently in birches growing upon a moist soil than in connection with any other tree with which I am acquainted, and when one attempts to study the cause he becomes so bewildered that he is ready to doubt the accuracy of the points that have been demonstrated apparently beyond all question.

But now to get back to the question of sugar. The sugar content of the elaborated sap has been found by analysis to vary in different trees from scarcely a trace to the high water mark of ten per cent. I have shown that the sugar is manufactured in the leaves. And it is maintained by most authorities, that the greater the leaf area the sweeter will be the sap. This is the truth, but not the whole truth. The whole truth is that the greater the leaf area in proportion to the size of the tree, the sweeter will be the sap and the more sugar that may be made from it. But it does not follow that a tree with an immense leaf area is a profitable tree for sugar-making purposes. For there is a close correlation between the leaf area and the amount of moisture that a tree will transpire. And a tree may, and very often does have a leaf area so large in proportion to its root-system, that, in spite of the doctrine of one to seven hundred, as already mentioned, it transpires so much moisture that there is very little surplus sap that can be stored. More than this, as I shall show presently, the physical configuration of a tree may be such that it has practically no storage capacity, and hence little or no surplus elaborated sap can be stored.

I have also shown that the trunk acts as a tank for the storage of the surplus elaborated sap. And the logical assumption is that, the larger and longer the trunk, the more sap it can store, and consequently yield, and hence the more profitable it must be. The first part of the assumption is correct, but the last part has its limitations. A tree of this kind can grow only in the thick woods, where the full development of its branches is hindered and its leaf area is restricted. Consequently, with its comparatively limited leaf area it cannot manufacture a normal quantity of sugar, and hence the sugar content of its stored sap must be low. More than this, the root-system of such a tree will naturally be crowded, and hence it may be unable

to furnish the necessary quantity of crude sap. I know of a sugar orchard in which the production of sugar was more than doubled by the cutting of two hundred cords of beech wood from among its trees. And I know of another from which one half of the trees were removed, and, after two years, there was no diminution in the quantity of sugar. So that the typical tree for the profitable manufacture of maple sugar, is one with an immense leaf area, but with a big, long trunk, or possibly several of them starting from near the ground, and a correspondingly large and vigorous root-system. Moreover, it must be located on fertile soil, and it must have an abundant supply of moisture, and the sunlight must have free access to all its leaves. Such conditions can be found, only in the open fields, or in the extreme edge of the sugar orchards, and it is here that the most profitable trees are to be found.

So much for the origin of the sugar. But now, how do we get the sugar? It is a characteristic of certain species of trees to yield a portion of their stored and elaborated sap, under certain atmospheric conditions, if wounded or tapped during certain seasons of the year. The seasons and conditions under which the trees will yield their sap, vary with different species of trees. Thus, the maple will yield sugar-bearing sap at any time during its dormant period, provided the atmospheric conditions are favorable. I do not need to take the time to explain more what those conditions are, for you understand them perfectly. The birch will yield sap laden with glucose, from the time that its leaf buds begin to swell, until the leaves have attained their full size, and at no other time. While the elm will yield its foul smelling and vile tasting sap only during the hottest parts of the hottest days of July and August. And the poplar tree, which contains relatively more sap than any mentioned will not yield a drop at any season, or under any atmospheric conditions. Why this is so, we have no idea. We can explain it no more than we can explain why one apple tree produces sweet and another sour apples. Or why one tree produces pears, another peaches and another beech-nuts. We can only say that it results from varietal characteristics of the different species of the trees. We do know, however, that the sap is forced from the tree by an internal pressure, and we believe that this pressure results from some unknown force that is entirely separate from and independent of any of the forces that influence the flow of the sap that constitutes the normal circulation of the tree. The officials of the Experiment Station have made some very careful investigations along this line, and

have collected an immense amount of very valuable data to which you are referred. They have found that the pressure varies from an internal pressure of sixteen pounds to the square inch, to an external pressure, or suction, equivalent to seven pounds to the square inch. Dr. Cutting also made some very careful studies along this line. He connected a tube with the tap-hole and carried the opposite end of the tube high into the tree, and he found that the pressure was sufficient to carry the sap to the top-most twig of the tree and no higher. This last experiment seems to indicate that there is a connection between the forces. The investigations of the Station seem to indicate that the alternate pressure and suction result from the alternate expansion and contraction of certain gases within the tree, and that the fluctuations of the temperature are an important factor in producing the fluctuations in the bulk of the gases. We who have observed the flow of sap in orchards of from five hundred to one thousand or more trees, under all conditions, and under all variations of both thermometer and barometer, are strongly inclined to the opinion, that, through the Station may be on the right track, it is a long way from the true and complete solution.

And now in conclusion, I want to say, that, while the comparative amount of sap that a tree will yield depends almost wholly on the atmospheric conditions during the so-called sugar season, the amount of sap contained in the tree is influenced largely by the moisture in the soil during the growing season of the previous year. And the amount of sugar contained in the sap is influenced still more largely by the comparative leaf-area of the tree during the previous year. Now, during the past summer, we have had an almost unparalleled amount of rain-fall coming in small quantities, so that the tree roots have had an abundance of moisture to transfer to the leaves. Also, the trees have almost overdone themselves in the production of leaves. Judging from the quantities of leaves that have fallen upon the lawns, the leaf area has been fully double that of last year. So that the appearances indicate that there is an unusually large amount of sugar now stored in the tree, and, with favorable weather next spring the yield of maple sugar should be unusually large. It is a lottery to calculate upon the weather, but, you will remember that there was comparatively little really good sugar weather last spring. You will remember, also, that, during the past fall, we have had comparatively little favorable weather. According to the rules of averages, these facts indicate that we should have an unusually favorable sugar-season. And then the

prices. If there is a man here who can remember when the demand for maple sugar was as great and the prices as good as at present, and as they promise to be next season, then his memory goes back a good deal more than fifty years. And so I say to you, Get ready for a big yield of maple sugar for next season and make all you can, and there is little doubt but that you will strike a rich mine.

And now in closing, I just want to say that I began this talk in the hopes that I might tell you something about how and where the maple tree gets its sugar. I have talked to you a long time, and you have listened with remarkable patience and I thank you for your attention. I have told you many things that we think we know about this matter. But, were I to tell you the things that we know we know, I could do so only by paraphrasing the remark of the honest old quarryman into the remark that, "When God made the maple tree He put the sugar in it and fixed it just as it is, and that is all there is about it."

THURSDAY MORNING.

MAPLE SUGAR MAKING AS A PROJECT FOR BOYS' AND
GIRLS' CLUBS.

MRS. JOHN B. CHASE.

Since Prof. Chenoweth has been telling you about "Apple By-Products" I would like to refer to an apple by-product that we have been making in connection with maple sugar. We call it "Maple Apple Candy". It seems to be a particularly appropriate combination of two of Vermont's best products, being exploited here by you in this joint convention of the Maple Sugar Makers' Association and the Horticultural Society.

Mrs. Grimes, an expert in dehydrating, and a temporary assistant of the United States Department of Agriculture, taught us to make apple candy with white sugar, and we have, because of the shortage of white sugar, substituted the maple sugar which we make ourselves. It makes a very wholesome and delicious sweet, more delicious than apple butter, and keeps fresh for months. It is a splendid thing to get boys and girls into the habit of realizing the value of windfall and cull apples, by combining with maple sugar, two things which we have in Vermont, and, also, to learn to provide themselves with one of the most healthful sweets in the world, rather than being allowed to buy the cheap candies in the market.

MAPLE APPLE CANDY.

Make apple sauce in the usual manner. Sweeten to taste with maple sugar. Boil till rather dry. Put, by tablespoonfuls, on brown paper to dry in flat pats. When not quite dry press in nuts or raisins.

CANDIED APPLES.

Pare apples. Slice into sections $\frac{1}{4}$ inch thick. Boil syrup to 232 degrees. Drop apples into boiling syrup, a few at a time. Cook until transparent. Lift out, drain,

cool, roll in granulated sugar and dry. Any fruits, such as grapes, peaches, pears, etc., with slight changes in the process of making, may be substituted for the apple, and some of the vegetables, particularly carrots, make a wonderfully delicate confection when handled in this way.

LET US CO-OPERATE.

I take it for granted that I have before me a representative group of the most scientific and practical maple sugar makers of Vermont. I suspect that there are many others in the state connected with the industry, who, if they were here, might contribute to, as well as gain from these meetings, all too apparent an evidence of our mountain tendency to live individually and not co-operatively. The longer we put off co-operation in our maple sugar production, or in anything else, the more surely do we lay ourselves open to attacks from our enemies.

I feel quite sure from what little I know of this industry that its future best development rests upon our ability as individuals to work together. Only last week a maple sugar maker told me that he was not coming to this meeting to exhibit any of his products because other people would be copying the good things he knew how to make out of maple sugar. This is a very limited and dangerous attitude towards this industry.

If you people were to make your wills to-night, passing on all the worldly goods you possess to some of the young people of the state, that would be worth very little to them in comparison with the knowledge that you possess, passed on to them.

The one boy or girl whom you start right will influence the whole maple sugar industry, or, for that matter, any other industry, much more than will the older people whom we try to convert to new practices. Two things we can do for the boys and girls around us: first, we can give them the value of our knowledge. Wherever we live it will be easy to arouse the interest of the boys and girls in the maple sugar industry, and then help them to become successful by giving them the knowledge that we have. I wish that every member of this Association, when you go home from here, would establish in whatever place you live, a local maple sugar club for boys and girls. You do not have to start out with this as a pioneer, as the State College of Agriculture has already undertaken to promote these clubs. I believe that this Association will find itself looking for its future development through an active interest

in these young people's clubs. Let us remember that the chief object of these clubs will be to give the boys and girls a glimpse of the possibilities of the maple sugar industry.

We need not fear, that, in interesting them in maple sugar production they will ever find themselves with a surplus on their hands as we have known them sometimes to have in the garden clubs. A farmer whom we knew last year raised a quantity of fine squashes, and is, this winter, obliged to feed them out to his stock, because although they are better used as human food, yet he has no local market, and the prices paid will not warrant shipping to the city market. There can never be such an over-production of maple sugar with only half a pound for every person in the United States.

We want this Association, by securing the help of the young people, to plan for a future victory in the maple sugar industry. This can be possible only when the best methods of production are known to them, and when they learn to get maximum results at a minimum cost of production. I do not see why you cannot, with the help of the boys and girls, give as great a boom to this industry as the people give to other things when they start out in Vermont. Liberty Loan Drives, for instance.

We have one of these maple sugar clubs in Lyndon. In forming it, rules similar to those at the State College of Agriculture were made. The ages of the boys and girls were limited to nineteen years. A pledge was signed that they would do certain reasonable parts of the work, keep an accurate account of the same, write the story of the year's work, and make an exhibit at some annual fair.

We have had some years, between 300 and 400 boys and girls in the Maple Sugar Club, and they are writing their stories, drawing cover designs for the same, and submitting their accounts. One of the rules is that they cannot bring any exhibit to the fair unless the account of production accompanies it.

When we first began our Maple Sugar Club we planned to have our exhibit in the fall, but we were not particularly successful in our fall displays. It was a very hard thing for the boys and girls to hold over their products. We never succeeded in getting more than twenty-five exhibitors at our fall displays. Two years ago we thought we would run up against some of the advice that we "never could do anything in the spring" and decided to follow the maple harvest with a spring exhibit, and it was a big success. People had a great deal to exhibit at that time.

How do we carry on this club work, the instruction, for instance? We have found that the school people are interested in all these movements. They have always allowed us to go into the schools and give some lessons about the maple sugar industry. Beginning in February, we go into the school once or twice a week. We went into the rural schools once in three weeks and gave talks on the subject. We have also been assisted by a great many people, like the president of this Association, who has given us a great many samples of syrup for standards, the Association sending us last spring the first, second and third grades of maple syrup to take to every school in town. And Prof. Jones, of the State University sent us some charts that were very helpful. These were taken around to the schools, and, with the aid of various bulletins, the children got into the subject enthusiastically, and prepared themselves before the season opened. The making of wooden implements for use in connection with actual sugaring was done in many instances.

In 1916, we had 150 boys and girls who booked up in this proposition. Out of that number we had only 20 who did not put the work through to a successful finish. They brought 191 exhibits. That year we had two contests for which we offered prizes. There was the hard sugar contest, promoted by one of our maple sugar buyers who wished to have us learn the amount of water shrinkage in a gallon of syrup. So blanks were made up, and the children started with a gallon of standard weight syrup to cook down. They had to record the amount of shrinkage, so that we would know how much water we were paying for when we bought a gallon of syrup. Mr. Ormsbee gave us some valuable assistance, and the prizes were awarded entirely on the accuracy of these records.

In the Fancy Maple Contest, prizes were offered for all the things you see displayed here, syrup, cream, sugar, cakes and candies. Mr. Ormsbee visited us and kindly judged the exhibits.

In 1917, we found that there was an opportunity for us to grow, as there was so much demand for products the children had made at their own homes when supervised by the Club teacher. We thought we would try and utilize more of the trees, so we had the children rent a few trees, from ten trees up, according to the age and ability of the children to handle them. According to the report sent out by the Commissioner of Agriculture in 1916, we found that there were in our town 100,000 pounds of sugar that we should have secured from available trees not tapped. We figured that we were allowing \$15,000 to rot in the

ground every year, and that would supply 508 persons with all the sugar that was their due, for a whole year. We thought it was up to us to get some of those trees busy, and it happened to fit right in with the emergency of sugar shortage.

We started a "Demonstration Camp" near our village. We found an orchard of 1,000 trees that had not been tapped for some years, and, with the equipment put in at a cost of \$750, we were able to do what we wished to do,—that is, to get some of the boys in and give them the instruction they needed in this industry. We had such a good time that we did not give up while worrying over how many tamarack trees they would tap, or how many of the boys would die of colds. One of our people whom we expected to help discouraged us with the thought that we would not be able to keep any help up there. It was our intention to give these boys up-to-date instruction on every step of the project. We broke the road to the camp on March 22nd, and the snow was six feet deep. We had to watch out for the little fellows who were liable to get into some of those six foot pockets of snow. On the 28th we began the tapping, and make the mistake of trying to have too many boys tap at once. We cut down to one boy with the man. On the 30th we got the first sap, and it was a very exciting time.

We wanted the girls to figure in the proposition and planned to have them take the product when the boys got it to the syrup stage, and turn it into fancy products. We advertised "sugaring off" days at the camp on certain days, and the girls would assist by selling the sugar at ten cents a plate, serve it on snow, and then wash the dishes, while the boys were demonstrating how to build the fires, skim and draw off the syrup, etc. We limited the age at from twelve to nineteen years. No boy could stay all day, and, instead of not having help enough, we had to drive some of them away, for they would bring their dinners and want to stay all day. We let them eat their dinners and sent them home when the afternoon shift came. We were there about six weeks and the children were never left alone. The woman in charge of the Club work was at the camp, and never felt so well in her life as when the season's work was over. The boys went out on a strike for higher wages about the second day, so we figured all the time out that they spent chasing squirrels, playing with the dogs, etc., and they decided to let the subject of increased wages drop. We paid them from three cents an hour, up to fifteen

cents an hour, according to their work, and none received more than fifteen cents an hour.

When it came time to close the camp we were sorry, and felt that we had had a wonderful experience. Some of the boys learned to do things very well. There was a great temptation to have them get a little vision of the whole thing, and not try to make a specialty of one thing, so we shifted them around. We wanted them to learn to drive the horses in the woods, and when they left sap in the pails, we wanted them to find out what it meant to let sap get sour in the pails. And when the sap spouts leaked, the boys were taught to drive them more firmly. They were taught to look after all the leaks. We trained two teams of girls to act as demonstrators, taking the syrup and turning it into various products, and planned to have them demonstrate it at the festival we held. At this festival we had several hundred children exhibiting their maple products, and some of the older people became interested and also exhibited. We had so many people come to the festival that we had to get an overflow hall. We had about 1,500 people who paid admission to our hall, and had to send 500 boys and girls to an overflow meeting. To finance the meeting we had \$35 from the Business Association in town, and \$18 contributed by three men.

Besides the demonstration camp we carried on the work of previous years in the Club by sending some one to talk in the rural schools, and go as much as they could to the farm homes to help make a better maple product. We worked it so that no boy or girl was left out of our Club last year. We have a village school of 300 or 400 boys and girls, and the first wet blanket was, "These children have no maple trees, and it is nonsense to talk maple sugar in this school", but we put it through, and, after we had offered prizes in this school, the same as in the rural schools, for those boys and girls who could buy syrup from the farm boys and girls, and turn it into fancy forms, they became enthusiastic. We had a maple sugar orchard near this village that is eventually to be turned into a park, that was loaned to us. No boy or girl could have over ten trees, and there were enough trees so that 39 of these village children had ten trees apiece, and we hired a man to go with them and help them tap their trees. Two little boys made three and a half gallons of syrup, and that family would not have had a drop of syrup if those boys had not made it.

One of the troubles that we ran against was the lack of suitable clothing for some of the boys to wear in the demonstration camp. When one starts out to do demon-

stration work one has to figure on every sort of a thing, and we had to borrow in a few instances.

One result of the season's work was that the boys and girls seemed to place a different interpretation upon work. That is one thing we all ought to do,—to interpret work rightly, and not to do all of the things that give us something at the end of the day, and call it drudgery, but to make them give us something that has been pleasant and agreeable. One girl received the championship prize offered by a farmer, to the boy or girl who would work best throughout the year. This girl also cleared well in the maple sugar contest, in the pig and calf club contests, and the gardening, canning and sewing contests. Just to show what can be done with boys and girls who have not had much to start with, I want to cite the case of this girl, who said, when she was given the sweepstakes prize, "Now I guess people will think that I can amount to something". I asked her what she meant, and she replied, "I have heard my grandmother say that I probably would never amount to anything".

At the meeting in St. Albans, one of the Canadian speakers, (Mr. Goddard) said that just as good syrup could be made from trees growing in a swamp as elsewhere. The syrup made in our village camp was made from trees in a swamp, and we were much interested to see, that, so far as color is concerned, our Canadian friend was right. As to flavor I did not judge that.

We had 1,000 trees in our Demonstration Camp, and made about 2,000 pounds of sugar. We bought in a little more from the boys and girls, and people around there who wanted us to market for them. We made a good quality and decided to get a good price if we could. We took the syrup to the high school and taught the girls, in their regular cooking hour periods, to make cakes and candy wafers. Then we packed the wafers into boxes which we had made. We had sample boxes sent us, but had our boxes made in Burlington. This box I am showing you, with the little folder which we had to go inside, that told just a story about the Club, and the price-list and labels, giving the name of the Club, and the commission which we gave for marketing, cost us thirteen cents to market. We tried to co-operate with your Association by not setting any independent prices on our products. We followed Mr. Chapin's prices on maple cakes. For maple wafers we followed the prices charged at Newport and St. Johnsbury by people who sold similar wafers.

The receipts of our camp this year were calculated very carefully, and we cleared \$300. Then we cleared enough to make it up to \$328.61, from the small fee charged at the maple sugar festival. Since then we have made a good many other dollars from marketing maple sugar. We had calls for so much that we wanted to hold the market, and so we have been buying sugar from different Club members, and now that Christmas is coming we hardly dare look in the mail for fear there will be more of those calls for maple sugar than we can supply. We noticed at the Springfield Exhibition that what people wanted, was sugar put up in small packages. We could not sell cans of sugar or syrup, but we could sell tons of maple cream and wafers and cakes. The prailins and cream will be two new things we will teach the children to make next year. In regard to the wafers which we make, we found that the people wanted two kinds. The old-fashioned maple sugar lovers want the grain unbroken, while the new generation that want everything to go down smoothly, want the sugar very soft and creamy. We found that the quality of what we put out is determined at the camp. For every time we have bought poor syrup, we have had poor results with the fancy product. All of the poor grade syrup from our camp we sold at a lower price. We marketed our malate of lime at Harvard College, where they are trying to find to what use they can put this by-product of the sugar camps, so the farmers will not stir it into the last batches. We found we had a good home market for our fancy products, and decided to supply the home market first, and so, all through the year we have been supplying one of our local grocers, and individuals.

These Maple Sugar Clubs fit in with any forestry club, or any tree clubs that the children are interested in; in the schools, in the question of woods, and the study of tree-planting; and the subject of fuel which is now so much before us. At present we are cleaning up our sugar orchard and gathering up the waste fuel. We must not be too sentimental about the maple woods. We need to thin them properly, and to save the waste. I went to one sugar orchard where the wood is rotting all around us while we are sitting down and howling about the shortage of fuel. We need to utilize the maple sugar orchard fully and judiciously.

PRES. CHAPIN:—While we extend our thanks to Mrs. Chase for the able talk she has given us, it has been suggested that the leader of the Boys' and Girls' Club work in Ver-

mont is present, and I will call upon Mr. Ingalls for a few words.

MR. INGALLS:—I shall not attempt to add anything to this wonderfully fine story that you have listened to concerning the maple sugar work of the boys and girls. I want to say just a word about the outlines. In general all our Club work runs along about the same outlines. Any boy or girl under nineteen can take up the different kinds of Club work, and we have different kinds of qualifications that must be followed, according to the project. In maple sugar work we have set units of ten, but if any child has been limited to a single tree we have been just as willing to encourage him in his work with that single tree if we are able to do so. We have four things that the children work on: quantity of output, quality, profit, story.

Back of the matter of profit is the record and report. We think this is valuable. We are coming to believe more and more that a person in any line of business ought to know where he stands. He ought to take an inventory, and he must have records and accounts and keep them up to date. In the Club work we are trying to teach the children to keep simply a record, and accounts, of what they are doing. Mrs. Chase has told us they cleared a little over \$300 from that camp work. How did they know it? From the very careful records and accounts that had been kept during the season.

There is a great deal in connection with the story of a child's work that can be done that is worth while.

Mrs. Chase has spoken of the Festival, which takes on the contest side, the exhibit side, prizes, demonstration work, and the royal good time for everybody. It is a real get together for the good of all.

We are furnishing the outlines for the coming year, and they will be changed a little. We will help also in the follow up work, in a measure.

In connection with the camp at Lyndon they had people from outside. The Extension Service will undertake to give some of those helps in any community where there is interest enough to organize a club or camp such as we have heard about. We shall be glad to hear from you at any time and will follow up any suggestions you may have or any offer to assist, and we will try to do our part.

PRES. CHAPIN:—Mr. Grimm, of Montreal, consented to come here and speak, but is unable to be with us. He sent his paper to Mr. Goddard, who will read it to us now.

CANADIAN METHODS OF HANDLING MAPLE SYRUP AND SUGAR.

JOHN H. GRIMM, MONTREAL, QUEBEC.

Gentlemen:—

Maple Syrup and Sugar making in Canada goes from one extreme to the other, it verges from the primitive to the modern, from the lowest form of blackstrap, burnt and none too clean, to the very best type of A 1 high grade maple syrup and sugar.

The Maple Sugar Maker is still in the process of education and such a vast territory has to be covered, population is so scattered, and means of communication not always of the best, that it is a very gradual process; and, while we are progressing, matters cannot be forced, and the man who is interested in raising the average standard of production of high class maple products, whether he be manufacturer of evaporating outfits, farmer producer, retailer or consumer must use the situation as it is, to go a step higher on the ladder next year.

The production of Maple Sugar in Canada was on the decline for years, chiefly owing to the fact that the producer was up against adulteration in various virulent forms, but a landmark in the history of this product was reached in Jan. 1st, 1915 when the making, selling or stocking of adulterated goods with a "Maple" label was absolutely forbidden. The producer has every inducement therefore to forge ahead in this great natural industry and as war conditions have forced the price of sugar, molasses, etc., sky-high, it is to be hoped that the Maple Sugar and Syrup Makers will take advantage of these conditions to further popularize this excellent and palatable luxury. Everything certainly points to a rosy future for the industry in the Dominion of Canada.

Now I said at the beginning that the methods of handling Maple Sugar in Canada verge from one extreme to the other; you can go out in the backwoods today and still find many farmers of the old type whose methods approximate closely to the early settler days; the sap is carried

on the old sap yokes and boiled in a kettle or pot of some sort, and the resulting sugar and syrup is of the strongest, blackest, and coarsest kind. These conditions prevail largely in the out of way districts of the large Province of Quebec. Beauce County for instance produces a large amount of this dark syrup and sugar, and while some experts incline to place the blame partly on the soil conditions, it mostly lies in backward methods of production.

As you know organisms of various kinds, bacteria and spores of a fermenting character get very numerous and multiply rapidly in carelessly collected and handled sap, and they affect both the color and the flavor; naturally the maple syrup produced under the conditions of Beauce County would be of the darker grade and heavier flavor.

I myself as a maker of the modern type of evaporator, am naturally interested in increasing the production of higher grade goods which take the proper outfit and care to produce. Most of the publicity campaign in connection with the selling of the outfit is educative and while some of the old generation are regular dyed-in-the-wool stand pat-terns in this respect, the higher price for the better product and the example of their more up-to-date neighbors is gradually eliminating this class.

We have to hammer away at the desirability of clean sap, clean pans, clean spouts, clean buckets, clean tanks, etc., and the necessity for quick boiling, and not keeping the sap stored too long, also the profits pro rata in making clean, high grade syrup as compared to the other. Experience in Canada has shown that soil has very little if any influence in the color and flavor of maple syrup if it is properly handled. Samples taken nearly 1,000 miles apart were practically indistinguishable even to the expert. These samples were taken in a prize competition conducted to find out the best Maple Syrup and Sugar Makers, their districts and their methods. It was also valuable as a basis for a series of tests as to the average high, as well as the average low, grade of maple syrup and sugar. The final conclusion reached in this case was that while soil conditions vary as to bacteria, they do not affect the sap, provided the sap is handled fresh enough to prevent increase in numbers and fermentation.

So much for general conditions as to the making of the product and the question of local conditions as affecting the grade is concerned. We will now turn our attention for a moment to the buying, selling and distribution:—

After thirteen years hard work the Canadian Government rose to the occasion and the new law has been a turning point with the entire Maple Industry of the Dominion. Prior to this law we purchased Maple Sugar from producers at 9c per lb. for No. 1, 8c for No. 2, 7c for No. 3, and 6c for No. 4. This new law has changed conditions altogether. The moment it went into effect confidence was restored between producer and consumer, as the latter felt reasonably sure that when buying maple syrup or maple sugar he was getting the pure article. The change had a tendency to stop grading, and producers found it much easier to sell the crop direct to the consumer.

The buying of Maple products is restricted to the Province of Quebec. Ontario disposes of 90% of her product to consumers at home. The remainder is shipped by producers to their friends who have migrated to the West, and the same rule applies to Nova Scotia.

In Quebec something like 40% is sold direct to the consumer, this leaves about half of the crop to be distributed amongst the various buyers. The concern that I represent bought during the past season about fifty thousand gallons of maple syrup, and about seven hundred thousand pounds of maple sugar. In the commencement of the season we offered \$1.00 per gallon on a grade system, and before the end of the season we paid as high as \$1.25 all in bulk. In Quebec there are certain districts where the farmers make syrup and not sugar, then again there are districts where they make sugar only. We supply our buyers with containers, such as 30 gal. milk cans and 40 gal. barrels.

We ship to various R. R. points, each buyer looking after three or four stations weekly during the season. After purchasing our maple syrup we obtain our supply of maple sugar, and this is purchased practically direct from the farmers, also through country merchants. During the commencement of the past season we paid 12c per lb. for maple sugar, but before having completed purchasing our full requirements we paid 13½c per lb. and during the summer season we purchased several car lots at 15c per lb. Our handling of maple products is all done through the wholesalers, our selling price being based on the buying price, and in addition to these prices we have to include our buyers' expenses, cost of packing, such as tins, bottles, etc. The syrup after reaching our factory is graded, the No. 1 quality being set aside to tone up the syrup later in the season that we make from remelted maple sugar. All No. 2 and No. 3 are put up in our packages, cans or bottles

to fill orders booked, or placed in stock for Fall and Winter delivery.

Local conditions render it impracticable to dispose of the sugar in a retail way to the consumer. Practically all sugar is remelted into syrup or made over into a composite sugar of average grade.

We have been shipping maple sugar to England and France. The Y. M. C. A. gave us an order for 75 tons, or 150,000 lbs. This sugar was made into cakes weighing 3 cakes to the pound and wrapped in parafine paper, in one pound cardboard boxes, making 150,000 boxes. This is re-sold to the soldiers at the supply camps of the Y. M. C. A. at a price to pay for handling.

We also accepted an order for 68 tons or 136,000 lbs. from the Canadian War Contingent Association and Red Cross Society. The Sugar was remade into $\frac{1}{2}$ lb. cakes placed in neat cartons each holding one cake.

There is an advantage, of course, in handling maple sugar in quantity, and that is, in the event of our supply becoming exhausted, we take the best maple sugar and make it into syrup, and with the No. 1 grade of maple syrup added this assists us in keeping up our grade of straight sap syrup. The No. 2 grade of sugar is made over into uniform blocks of $\frac{1}{2}$ lb. or 1 lb. which is sold to our regular trade throughout Canada or exported to England or France. The poorest quality or the dark grades are sold to American buyers, a good share of which goes into tobacco and the remainder is used for blending purposes.

THURSDAY AFTERNOON.

BUSINESS SESSION.

PRES. CHAPIN:—The business meeting of the Vermont Maple Sugar Makers' Association is appointed for this hour. I will introduce Mr. C. A. Badger of East Montpelier, who has a few words to say.

MR. BADGER:—I didn't expect to be called on to speak before the public, but thought I was to take up this matter with the officers of the Association. What I will have to say is, not in criticism of the officers of the Association but will be for the benefit of the Association.

When I was down in Springfield last fall at the Eastern States Exhibition, Vermont had a booth there, and in one corner of it was the maple sugar display, and maple sugar to sell. That was under the jurisdiction of the Commissioner of Agriculture, Mr. Brigham, but what struck me was that the Sugar Makers' Association did not seem to have any part and was not recognized in that exhibit in any way. It seems to me as though we could have a little exhibit there something like this that we have before us, and then have goods to sell, and some of those boxes. For the price they were willing to pay it would be a pretty good advertisement for the product and a good advertisement for the Association.

I should recommend that the officers of our Association appoint a committee to carry out some such project, and also appoint a publicity committee, and have these committees meet with the officers of the Association sometime in the spring to make arrangements for the goods to carry out this work, and perhaps meet with them again in the fall and make arrangements. In fact, take these committees into their confidence, and I think we could advertise the Vermont Maple Sugar products to great advantage. I know that there was something like three tons of maple sugar sold there last fall in a very short time, and as much more could have been sold if the goods had been at hand. I think as it has been during the past few years, that the work has all fallen upon one or two of the officers

of the Association, and this is too large an association for that number to handle. I think there ought to be more of us to work in the field and create a little more interest and enthusiasm in the work of the Sugar Makers' Association.

MR. ORMSBEE:—I move that this matter be left with the Executive Committee with the recommendation that they investigate the subject and take some action on it at an early meeting of the Committee.

Motion was seconded and carried and no further action taken.

(NOTE:—The Executive Committee held two meetings for the discussion of this matter, and adopted the recommendations, and were making arrangements to erect a booth for the sale of Maple Products and for advertising the Maple Sugar Industry, when it was learned that, owing to war conditions, no fair would be held. Thus the matter was dropped.)

PRES. CHAPIN:—We will now listen to the report of the Secretary.

MR. ORMSBEE:—This report will necessarily be very brief. As you will remember, S. A. Merrifield was elected Secretary at your last annual meeting. He performed the duties of the office until last October, and then resigned in order to enter the service of the Government, and I am glad to say that he had the courage to enlist instead of waiting to be forced into the army by the draft, as so many of our young men have done. In November I assumed the duties of the office as Acting Secretary and have arranged the best program that it was possible for me to prepare in the short time allowed.

I have not yet received the Secretary's books and records, and so cannot give you a full account of the work of the Association, but the Association seems to be in a prosperous condition. There is now a total of very nearly 500 members. There has evidently been a decided falling off in the number of paid members and a comparison of the list with that of the previous year shows that very few new members have united with the Association. The falling off in paid membership is accounted for by the fact, that, on account of the \$50.00 cash prize offered by the evaporator companies to the man who should secure the largest number of new members, solicitors induced large numbers of men to join, who were but little interested in

the Association, and had no intention of keeping up their dues. From the data that I now have, I judge that we now have not far from 130 paid-up members.

The reason that we have not enrolled more new members is owing to the fact that you, as interested members, have not done your full duty in inducing your neighbor sugar makers to unite with us. I hope that you will put forth greater exertions along this line in the future.

REPORT OF TREASURER.

C. O. ORMSBEE, MONTPELIER.

Receipts and Expenditures.

Receipts.

Jan.	5	Received from S. A. Merrifield,	\$ 144.10
	6	Received from S. A. Merrifield,	100.76
	15	Received from State Appropriation,	500.00
	22	Received from S. A. Merrifield,	3.00
	26	Received from S. A. Merrifield,	3.00
Feb.	26	Received from S. A. Merrifield,	63.25
Apr.	9	Received from S. A. Merrifield,	154.00
Nov.	19	Received from S. A. Merrifield,	41.00
Dec.	4	Received from C. O. Ormsbee, cash returned	5.85

\$1,014.96

Expenditures.

Jan.	6	Paid Tavern, for entertainment,	\$ 72.75
	9	Paid P. B. B. Northrop, services as Auditor,	6.33
	11	Paid Jos. S. LeFevre, speaker, 1916,	16.35
		Paid L. E. Cook, speaker, 1916,	10.00
		Paid Elizabeth Chase, speaker,	8.00
		Paid J. C. Gilbert, speaker,	20.48
		Paid H. W. Tinkham, speaker,	24.85
		Paid Free Press Association, printing,	9.90
		Paid S. A. Merrifield, expense as Treasurer,	15.94
		Paid A. A. Carlton, expense as President,	12.58
Feb.	1	Paid Premiums in Class A	50.00
		Paid Premiums in Class B	35.00
		Paid Premiums in Class C	10.00
		Paid Premiums in Class D	175.00
		Paid Premiums in Class E	53.50
		Paid Premiums in Class F	7.00
		Paid J. F. Snell, speaker,	6.00
		Paid Amos Eaton, speaker,	6.73
	14	Paid H. B. Chapin, expense as Secretary,	35.12
	28	Paid C. O. Ormsbee, mileage and postage,	4.92

Mar. 21	Paid Mrs. W. S. Dodd, speaker,	8.55
24	Paid Susan A. Nott, reporter,	44.56
	Paid E. S. Hildreth, printing,	9.00
June 27	Paid Brooks Bank Note Co., labels,	36.44
	Paid Buck Printing Co., printing,	45.14
Aug. 2	Paid Brooks Bank Note Co., labels,	31.73
Oct. 16	Paid Capital City Press, printing,	4.00
Nov. 21	Paid Capital City Press, printing,	2.50
	Paid Free Press Association, printing,	5.98
	Paid C. O. Ormsbee, for current expenses,	15.00
	Paid S. A. Merrifield, expenses as Secretary,	28.54
Dec. 4	Amount on hand,	202.60
		<hr/>
		\$1,014.96

I hereby certify that I have this day examined the accounts of the Treasurer of the Vermont Maple Sugar Makers' Association, as presented by C. O. Ormsbee, the treasurer, together with the vouchers which make up each item, and that I find them correct as reported, and that there is a balance in favor of the Association of \$202.60 at this date.

Dated this 4th day of December, 1917.

MR. MARTIN:—I move that the reports of the Secretary and Treasurer be accepted and adopted.

Motion seconded and carried.

ELECTION OF OFFICERS.

PRES. CHAPIN:—There being no objection we will now proceed to the election of officers. The first officer to be chosen is a president. Please make your nominations for a president.

MR. NORTHRUP:—I nominate H. B. Chapin to succeed himself as president for the ensuing year.

Nomination seconded. Vote called by Mr. Spear and Mr. Chapin was elected.

PRES. CHAPIN:—I thank you for this mark of your confidence and I shall endeavor to serve you to the best of my ability for another year. The next officer is secretary. Please make your nominations.

MR. SPEAR:—I nominate Mr. C. O. Ormsbee, of Montpelier.

Nomination seconded by Mr. Martin. Vote taken and Mr. Ormsbee was elected.

PRES. CHAPIN:—The next officer is first vice-president. Please make your nominations.

MR. JENNE:—I nominate Mr. C. E. Martin, of Rochester.

Nomination seconded by Mr. Northrop, and Mr. Martin was elected.

PRES. CHAPIN:—Whom will you nominate for second vice-president?

MR. ORMSBEE:—I nominate C. H. Colvin of Rutland.

Nomination seconded. Vote taken, and Mr. Colvin was elected.

PRES. CHAPIN:—Please nominate some one for treasurer.

C. F. Purinton, of Burlington was nominated. Nomination was seconded, vote taken and Mr. Purinton was elected.

PRES. CHAPIN:—Please nominate some one to serve you as auditor.

For auditor, P. B. B. Northrop, of Sheldon was nominated. Nomination seconded, vote taken and Mr. Northrop was elected.

PRES. CHAPIN:—It has been suggested that we appoint a committee to act with the committee already appointed by the Horticultural Society, to further the interests of fruit-growing and other industries, by securing better legislation in regard to the deer, and, incidentally, the dog nuisance. As I understand it the present idea in regard to the deer is to establish an open zone around commercial orchards. What action will you take?

MR. JENNE:—I move that the Maple Sugar Makers' Association co-operate with the Horticultural Society in this matter.

Motion seconded by Mr. Ormsbee, and carried.

PRES. CHAPIN:—I think the members of the Maple Sugar Makers' Association are heartily in favor of any law that will be beneficial to the state of Vermont, and I certainly think that laws looking towards the abatement of these nuisance will be wise. We do not want to drive

the deer out of the state, but we do want to encourage fruit-growing, and we cannot do this if we allow our orchards to be damaged by the deer. Nor do we wish to have our sheep driven out by the dogs. I think that the members of the Executive committee will be glad to co-operate with the Horticultural Society, and, unless other suggestions are made, the matter will be left to them.

None are heard, and the matter is referred to that committee.

PRES. CHAPIN:—At our last meeting a committee consisting of Mr. Carleton, Mrs. Dodd and Mr. Story was appointed to consider the feasibility of organizing a co-operative association to manufacture and handle maple cream. Mrs. Dodd, as a member of that committee will now report.

MRS. DODD:—This committee held two meetings in February. There were present at these meetings, the members appointed, together with Mr. Chapin and Mr. Ormsbee as ex officio members, and Mr. Brigham, State Commissioner of Agriculture. It appeared at once that the only way to handle a proposition of this kind was to organize a manufacturing company composed largely, or wholly of Association members. Obviously, within reasonable bounds, the larger the company and the more capital it can command, the less will be the comparative expenses, and the greater will be the comparative profits. With this in mind we figured on an organization capable of handling the product of 200,000 trees. The summary of our discussions would form itself about as follows:—

A plant of this capacity would necessitate the following expenditures:—

Building,	\$10,000
Equipment,	7,000
Cost of Making,	15,000
Packages,	4,000
Manager,	3,000
Incidentals,	1,000
Total,	\$40,000

As a co-operative association it was assumed that each member would take stock upon a basis of twenty cents for each tree. This would furnish the money necessary for the plant and its operation. In regard to the cost of

the raw material, it is assumed that each member of the organization will deliver his product to the company and receive his payment pro rata when the sugar is sold.

In case the raw material is purchased outright and paid for on delivery, it will be necessary to have a much larger sum of money as a working capital. We called a banker into our meeting for advice, and he informed us that the necessary capital could easily be secured by placing the product in a warehouse and bonding that and the plant, provided the storage of the product, its cost and selling prices and the management of the business were to the satisfaction of the bank. This is as far as the committee has been able to go.

MR. ORMSBEE:—It seems like a pretty big proposition to handle the product of 200,000 trees, but it is only about one fiftieth part of the available trees in the state. The estimates also show, that, even with a margin of only one cent a pound above the cost of the raw material, there would be a net profit to the stock holders of ten per cent on the investment. It would seem as though there should be no trouble in organizing such an association, though it is a matter entirely beyond the jurisdiction of this Association.

MR. NORTHRUP:—I move that the report be accepted.
Motion seconded and carried.

PRES. CHAPIN:—At our last meeting it was suggested that the Association issue a trade paper in the interests of the Maple Sugar industry. The idea was to have this paper give up to date articles on the best methods of manufacturing maple products and to wake producers to an increased production, as well as a better condition of things generally, it was suggested that such a publication would have a much greater influence if issued under the auspices of this Association than it could have if originating with any set of individuals. A committee was appointed to investigate the matter, and Mr. Purinton, of that matter will now report.

MR. PURINTON:—This committee feels that this Association is greatly in need of some means of publicity and education. The Association actually reaches but a very small percentage of the sugar makers of the state, to say nothing of those throughout the country. Nominally we have a membership of but 500, out of the 10,000 sugar makers of the state. And of these 500 members, probably not over ten per cent come annually into a direct and intimate personal contact with the Association. And those

who are not thus connected with the Association are the very ones who stand most greatly in need of such a periodical.

We have made some investigations and received some estimates, and also run into some difficulties in regard to the matter. One of these is the size and appearance of the paper. Several sizes were considered and the one that seems to lend itself best to our needs is of the bulletin size such as is used by the experiment stations. This is an economical size to get out, is of a convenient and standard shape, and, if fathered by the Association, it should have a good standing. We found that we could get out a paper of this size, containing eight pages of reading matter and two covers, in monthly editions of 1,000 copies a month, for \$600 per year, with a sort of a sliding scale for a larger edition or a greater number of pages. We figured that the editorial and business management would amount to \$300, and incidentals to about \$100 more, making \$1000 per year for the total cost. The subscriptions and the advertising should return considerably more than this, thus leaving a balance in favor of the Association.

PROBLEM.

But the particular problem which is the hardest to solve is the financing of the enterprise. Shall it be done by means of a special company or association of men who will finance it for profit, or shall the paper be conducted by the Association as its own publication? There are difficulties along both these lines. If carried on by an Association of individuals for profit, we will forfeit the privilege of getting certain state appropriations which we could get if the paper were issued as a periodical of this Association. But we would have a financial standing with the publishers. On the other hand, if carried on by the Association as an educational feature without any profit expected, and if one should result, it would be turned over to the Association as a benefit, we should have a much stronger hold upon the sugar makers, and we could receive much more assistance from the University, and those in connection with government investigations of the subject, but we would have no financial standing, and there would have to be a guarantee from some financially responsible party that \$1,000 would be forth-coming during the year to insure the publishers against loss.

This is as far as we have been able to go, but we fully believe that a publication of this sort, properly edited and

properly managed would have a wide circulation, not only in this state, but throughout the entire sugar making district, and, once launched, would return a considerable profit to the Association. With this we leave the matter with you and invite the fullest discussion.

MR. SPEAR:—I am throughly in favor of the proposition of having a publication under the supervision of the Association. I don't know just how it can be financed and operated successfully, but I have considered the matter for years. One of the weakest points in our organization is that we have so little direct communication between the members and between sugar makers in general. There should be a greater interchange of ideas and views and more often than once a year, where we only get a matter of fifty members together to hear what little can be said in the limited time given to the papers and discussions. My idea is that a publication of this kind should not be limited to a thousand copies. We have 10,000 sugar makers in the state of Vermont, according to the nearest estimates that can be made, and probably more than that in both New York and Ohio,—probably 35,000 in the three states.

MR. ORMSBEE:—The last census returns show 25,000 in New York, 12,000 in Ohio, 10,000 in Pennsylvania, and 87,000 in the entire United States, exclusive of the 55,000 which Mr. Goddard tells us are in Canada, making a total of more than 140,000.

MR. SPEAR:—In some way we ought to reach a good share of the people who are making maple sugar, not only to enable them to make better goods, but to keep them informed on market conditions. The average sugar maker knows very little about the market condition for maple goods. The general trend of information that would encourage and help the industry is very hard to get hold of. I believe that the advertising will go a very long way towards paying the expenses of a larger edition. We all know that the advertising value of an edition of 10,000 copies is ten times as much as for the same space in an edition of 1,000 copies, while the editorial work and the work of compilation is no more on one than upon the other. I believe that it would be worth while for our committee to continue investigating this subject with a view of enlarging the field and doing a larger work if we do anything.

MR. PURINTON:—The committee did not consider that 1,000 copies was anywhere near the limit, because we realize that there are 1,000 people in Vermont who ought

to have this paper, and 100,000 out of the state who ought to have it, but we had to take some standard for an estimate. With the circulation increased the composition work remains the same, and many of the other expenses do not increase. In fact, few of them do increase in like ratio. So we figured on a low estimate at the start. We believe that advertising can be obtained sufficient to defray the full expense of the paper and leave a very substantial profit for the Association, or allow a very nominal price for the subscription. We merely used that number as a basis for computation. And we did not take into account any return for advertising. We merely calculated the expenses without any returns from advertising. I would like to ask the President if there is any possibility of a group of men guaranteeing to make up any deficit that might occur, in starting this publication for the first year.

PRES. CHAPIN:—The chair knows of no such group of men. I would be glad to hear from individuals.

MR. MARONY:—The way I have seen these things handled in the past is that a group of men who are financially responsible would raise the money at the bank, on their notes, and I would be willing to go on such a note for one hundred dollars.

MR. PURINTON:—I would be willing to sign such a note with nine others.

MR. SPEAR:—I will be one of the ten.

MR. MARTIN:—I will be another.

MR. ORMSBEE:—When we once get this business into a successful operation we can carry it in for a good deal less than a cash capital of one thousand dollars, but if we attempt to start it for that sum we shall surely make a failure of it and the guarantors will be obliged to forfeit the sums they pledge. We shall look to our advertising and our subscription list for our income. Now we have no subscription list, and we cannot get one without giving each subscriber the full value of his money and we cannot do that with a monthly publication of only eight or ten pages. We would not be able to get fifty subscribers to such a paper. And without a subscription list we cannot get the advertising. If we issue a paper at all, we must issue one fully six times as large as the one proposed. That is, it must have fifty or more pages of good reading matter. I find that we can do this for

\$1,200 a year with a sliding scale for increase in size of editions and number of pages. This is considerably less than the estimate given Mr. Purinton. Then we must have a capable man for an editor and business manager and a man who is capable of holding that position can command a salary of \$2,000 a year. A cheap John, working the business as a side line will surely make a failure of it. And, again, people are not going to jump at the chance of subscribing to such a paper, or of advertising in it. We must have agents, working on liberal commissions to solicit advertising and subscriptions. And these commissions will eat a big hole into our capital at first. And the contributors must be paid and there is the postage, not only upon the papers, but upon the editor's letters, and the store stationery and the office rent and a thousand other incidentals which will arise as we proceed. Even with the Association back of us with all of its support, we cannot undertake this business with any reasonable expectations of success without a paid-up cash capital of fully \$3,000, and twice that sum would be better. I don't see how this Association can handle any such a project. But a business association might easily be formed, similarly as the Maple Sugar Makers' Market was organized some years ago, which could handle it successfully. I am anxious to see the project go through and if such an association is organized I will take stock in it to the amount of \$500, and possibly more.

No further action was taken, except that the committee was requested to continue its investigations.

PRES. CHAPIN:—I have here a letter which I recently received from Professor Hills, and which I will now read:—

Burlington, Vt., Nov. 23d, 1917.

Mr. H. B. Chapin, President,
Vermont Maple Sugar Makers' Association,
Middlesex, Vt.

Dear Sir:—

I am writing to you in your capacity as President of the Vermont Maple Sugar Makers' Association to make this suggestion:—You will recollect that President Benton of the University is located for this year in Paris. He is in charge of the Y. M. C. A. activities for that city for the National War Work Council—he is the "king pin" so to speak. Now he would like to have several hundred pounds of maple sugar sent him to use in connection with the American boys to feed them when they come back from the trenches and as they visit the Y. M. C. A. in Paris.

It occurs to me that it would be a very pretty thing for your Association to donate this sugar for this particular purpose. I be-

lieve that you would be justified in doing this and that you would find that your members would respond. The President intimated that perhaps 500 pounds could be used to advantage. Can you not take this up at your next meeting and advise me as to the possibilities?

Thanking you for the courtesy, I am,

Yours truly,

J. L. HILLS, Dean.

Professor Hills is in the room, and perhaps he will speak further upon this subject.

PROF. HILLS:—I will read an extract from the letter from President Benton, dated Oct. 5th.

"You will be interested to learn that the first cry of our soldiers, when they come from Camp, is for American food. Apparently they want ham sandwiches, mince-pies, griddle-cakes and maple syrup. This fact emboldens me to ask if it will not be possible for you to enlist the services of some of our good Vermonters to send us 400 or 500 pounds of good maple sugar. If we could serve griddle-cakes and maple sugar on Sunday morning in the Y. M. C. A. Buildings it would be appreciated more than anything else we could do for our soldiers who are enduring great hardships for our common cause."

Now, it is not for me to say whether or not, you, as an Association have the power to do this, but, if you have a membership of 500 members that would be equivalent to one pound apiece, and it would seem that you might easily get sugar enough to send over there to sweeten the lives of those boys. We have a large number of Vermont boys there, and it is worth while thinking about whether it is not practical for you to respond to this request.

MR. ORMSBEE:—We have on hand, in the pro rata exhibits, more than the equivalent of 400 pounds of sugar, and we can easily obtain the rest, if thought best to do so. And my only objection would be this:—A large part of our funds comes from the State Appropriation which is allowed us for certain specified purposes. And, if we expend it for other than those purposes, the State Auditor has power to withhold a part or the whole of that appropriation. This is a little outside of the ordinary expenditures and I am not certain whether the Act appropriating this money is broad enough to cover this expenditure or not. Has any one looked this matter up to see if we can do this without being liable to get into trouble with the State Auditor?

PROF. HILLS:—I don't know.

MR. SPEAR:—I am fully in sympathy with this proposition that Dean Hills has put before us, and the request

of Pres. Benton. I am very sure that there is nothing in the Statute that created this organization, or which makes the appropriation, that would forbid our using our funds for this purpose if we think it wise to do so. The authority given us is very liberal. The appropriation is for the purpose of advertising and furthering the maple sugar interests of Vermont, and I don't believe there is anything we could do that would be more to the credit of the Association than to take action along this line. And, if we have a State Auditor that will object to an expenditure being made for this purpose, it is high time for him to be relieved from his office. For one, as a member of this Association I strongly favor this appropriation, and I am perfectly willing to take the risk of facing our State Auditor as to our authority to make this expenditure.

MR. ORMSBEE:—If that is Mr. Spear's opinion, I will withdraw any objection that I might have had.

MR. BADGER:—I move that this Association appropriate 500 pounds of sugar to be sent over to the boys in France.

MR. ORMSBEE:—Buy enough to complete the 500 pounds, with what we now have?

MR. BADGER:—Yes.

MRS. DODD:—If there was time to get the news out among the farmers all over the state I have no doubt but what a large contribution of sugar would be received. I personally, have sent every scrap of sugar that I had, and I have found that the farmers are willing to make a very low price on sugar and syrup for this purpose. If there was any place here in Burlington where contributions could be sent and made into cakes, I have no doubt that we would find the farmers of Vermont very generous.

PROF. HILLS:—I think that Mrs. Dodd's suggestion is a very good one, and if the action was stated in the papers, and it was known over the state that the Association asks for donations to increase that amount, I believe we would get much more than 500 pounds to send over. I think it is safe to say that Welch Brothers would sugar it off and send it in the form of sugar.

MR. PURINTON:—I will agree to sugar it off up to 1,000 pounds without any charge. If it continues indefinitely, it might be necessary to make a small charge.

MR. GODDARD:—When the war started they asked the farmers in Canada, who made maple sugar, to give what

they wished to have go across, and the buyers for the Maple Tree Producing Association received it at the points where they bought, and later it was sent in to the headquarters of the Maple Tree Producers Association, and it ran up into tons the first year, and that has been increasing until up to this year they are making and forwarding, and it has already gone for Christmas, to the Canadian soldiers in England and France,—nearly twenty tons of maple sugar. It has been financed more lately by the Red Cross. They have bought it and sent it in. The president of the Maple Tree Producers Association, Mr. Grimm, has charge of it, and he takes it and puts three cakes in a box. The box in all weighs a pound, and every soldier that has enlisted from Canada this coming Christmas will receive a pound of maple sugar. Of course there are 440,000 of them enlisted, so that it makes some sugar. I am sure that your people in Vermont will, each year as your boys go over there, feel a greater readiness, when you know the trials and suffering they will have to take in trench life, to do all that you can for them, and your boys will be in a better position than our Canadian boys were the first two years, for things are different on the western front then than they are today. I don't think there is a man in Vermont who would not be willing to give three or five gallons of syrup if he knows it can be gotten to the boys that have gone over there.

MRS. DODD:—May I suggest that the motion be amended, that the Maple Sugar Makers' Association make an appropriation of the sugar which is here now and that the Association ask the farmers to donate what they can, if Prof. Hills thinks the Experiment Station will receive it and see it through the sugaring off process.

I move that either the officers of this Association or some committee, shall see to it that further contributions of sugar for the soldiers may be sugared off in the best and most economical way possible and shipped. If some manufacturers would, for a reasonable charge, take care of further contributions I think we could send more to Europe besides this 500 appropriated. I could see to the gathering of a good many contributions on my side of the state, and instead of sending it to Burlington we could send it to New York. I move that you appoint a committee to handle further contributions.

Motion seconded by Mr. Putnam, and carried.

The President appointed as such committee, Prof. J. L. Hills of Burlington, V. I. Spear of Randolph, and Mrs. Dodd of East Corinth.

MR. SPEAR:—As nearly as I can estimate the appropriation we are making today will not call for much solicitation on the part of the Association. We have nearly that amount on the tables, and I don't know of any better use that we can make of it than to put it into some suitable form and send it along. Probably the sugar cakes would be the most desirable.

PROF. HILLS:—I will look after the expense of transportation, from the time the material is ready in Burlington, to New York, and the Y. M. C. A. in New York will look after the expense from New York to its destination.

PRES. CHAPIN:—It would seem that as long as the goods are here in Burlington that Mr. Spear's suggestion is a good one, and I am inclined, provided this motion is passed, to accept the services of Mr. Purinton and Prof. Hills. And if there is nothing further to be said we will put the question to a vote.

As many as favor the motion that the Sugar Makers' Association donate 500 pounds of sugar, including the amount we now have, which amounts to around 400 pounds, for the benefit of our soldiers in France, to be used by the Y. M. C. A. officers, of whom President Benton is the Chief, in Paris, will make it manifest by saying Aye.

The ayes have and it is so voted by the Association, and unless objection is made we will take it for granted that this sugar will be left in charge of Mr. Purinton.

FRIDAY MORNING.

INSECTS INJURIOUS TO MAPLE TREE.

HAROLD L. BAILEY, ASST. TO COMMISSIONER OF AGRICULTURE
IN CHARGE OF INSECT SUPPRESSION.

Mr. President, Ladies and Gentlemen:

Three years ago it was my privilege to appear upon the program of the Sugar Makers' Association at its annual meeting at Montpelier with a subject very much like that which has again been assigned to me. I have been somewhat at a loss to know how to avoid too much repetition and at the same time touch upon those insects which are of prime importance to the maples. Perhaps I ought to go ahead regardless of the preceding paper, on the grounds that if it made an impression it would stand an encore, and if it did not I should try it over again. As a matter of fact I have tried in this paper to make a report of progress on the subject and at the same time to consider some of the general features in the situation.

Insects injurious to maple trees and insects injurious to forest trees in general present a greater problem than do those affecting chiefly orchard trees or truck crops and must be viewed from a somewhat different angle. In the case of those affecting the cultivated crops there are, generally speaking, three classes of control agencies: Natural, artificial and incidental, that is (1) the control by birds, parasitic insects, disease, reptiles and insectivorous mammals; (2) control by man-devised methods such as spraying, banding and egg removal and (3) control by measures incidental to other work, such as pruning, cultivating, destroying rubbish and the removal of worthless growth.

In the case of forest insects there are, generally speaking, only the natural, and, to some extent, the incidental, methods to be relied upon. Of course I am not referring here to forest trees used for shade, park or ornamental purposes.

The process involved in the natural control of insects presents one of the most interesting phases of the great

check and balance system provided by nature, a system which, unmolested, would undoubtedly keep all the species and kinds in the animal and the vegetable kingdoms within their proper bounds and relations to one another. It appears that it is only as a result of man having thrown the proverbial wrench into this delicate machinery that extended and long continued outbreaks of insect pests have occurred. In the natural condition of things almost any given species of the insects is preyed upon by birds, by larger insects which literally catch and eat them, by smaller insects which pass their entire growing period on or within them, by disease and by reptiles such as toads, snakes, etc., and, in smaller measure, by mammals.

Now, from the fact that periods of unusual abundance of certain insects were known under primitive conditions it cannot be maintained that this natural balance was an even one. The strength of the various kinds rose and fell, but it never remained *long* at its high mark. So, today, in the case of native insects, we see them come into periods of extreme plenty. Sometimes, it seems, in such great abundance that vegetation must be destroyed, but within a season or two they become so few in numbers as to be hardly noticeable. Witness, the tent caterpillar through the past five years, or the forest tent caterpillar twenty years ago, and again, in certain parts of the state, more recently.

Presumably the inroads of these insects, while on their high wave were less severe two hundred years ago when birds were more plentiful, but the principle of the balance is obvious. Through favorable circumstances a species multiplies rapidly for several years. It becomes extremely plentiful. Then, through consequent favoring circumstances, all the little insect parasites dependent upon that species for a living, increase amazingly. Birds and other animals are attracted by the vast numbers, and it is known that some generally unaccustomed to feeding upon certain species of insects, develop a taste for them during plentiful periods. Disease, which naturally flourishes when any animals are closely crowded, is an important factor in smoothing down these high waves.

So much for native insects, under natural conditions. Now consider the effect of taking insects into country to which they are not native, or otherwise creating unnatural conditions.

Fifty years ago the gypsy moth was brought over from Europe and several years later escaped at Medford, Massa-

chusetts. Since then millions of dollars have been spent by the federal government and the New England states to fight a pest which, except where it has been actually beaten down by main force, so to speak, shows no sign of subsiding. The brown-tail moth was imported from Europe about thirty years ago, and has raged almost since its first liberation in the country. The San Jose scale was brought to California from China sometime about 1870. It has cost orchardists millions of dollars since then in control measures and loss of trees. I might go on citing instances of the like indefinitely, all based upon the same principle; the disturbance of the natural balance, the transportation of an insect out of its native element where it was controlled by its natural enemies to a place where it is not so controlled because those enemies are absent.

I consider this subject at such length because it is on this sort of control that we must chiefly rely in the protection of maples in sugar places, and if the situation is fully understood we may be more likely to lend such aid as is possible in assisting the balance to right itself.

It is of prime importance, as you know, and as you have been told hundreds of times, to aid and abet the insectivorous birds in every way possible. Lend your aid in seeing to it that the law, which is generally good so far as the bird situation goes, is enforced, and don't maintain a surplus of cats over and above what is necessary to discourage the rats and amuse the children. The bird societies hold the house cat to be one of the chief destroyers of valuable birds.

In our present connection, the woodpeckers are of highest importance since they destroy the sugar maple borers which are enemies of the first magnitude to the maples.

With the exception of a few measures of which I shall speak in direct connection with certain species, there are no general artificial control measures to be carried out profitably in sugar orchards. The expense of spraying is, of course too great, and banding, etc., groups of a thousand trees is more of a job than the ordinary owner can afford, either in time or in cost of material.

Of the so-called incidental measures, however, there is one particular practice which I wish to recommend; that is, the removal and burning up of weakened diseased or insect infested trees. This might be worked into the "cut a cord" campaign. Seriously weakened trees, by reason of the fact that they afford first class breeding places for borers, are

menaces to the rest of the trees in the vicinity. They should be cut and removed at once. While this applies particularly to maples, the same doctrine should be adhered to in the case of all worthless trees, such as the wild apple which harbor many leaf eating insects that attack maples.

In taking now the insects injurious to maple trees I shall try to be brief, and mention only those points which are of value. Your Secretary has asked that I prepare a check list of maple tree insects in full. This will, I presume, be appended in the printed report, and when you see it you will be thankful that I have let you off by talking about as few of them as I have taken.

The gypsy moth, about which I have just spoken, is an enemy of the maple tree as well as of most all forest trees and orchard trees. It has not become generally established in the state, but since my last talk before you, it has gained a slight foothold along the extreme eastern edge of the state. That is the section in which it would naturally first appear since it has been spreading from the east. A circumstance of this year's scouting, however, demonstrates the likelihood of its appearance in other parts. An infestation of fifteen or twenty egg masses was found in White River Junction village and search revealed the fact that a mass of the previous season's eggs had been brought there on a piano case, thus starting the colony. Such an occurrence might as well happen in any other town. A box or crate stands about the premises in some southern New Hampshire or Massachusetts town during the late summer, a female gypsy moth emerges from the pupa on the butt of the tree nearby, or from the underside of a stone. By falling from the tree, or by crawling up the first thing she comes in contact with she is on the wood at the time she is ready to deposit eggs; and a fuzzy yellow-colored mass of five or six hundred eggs is soon ready for transportation to parts unknown. This is why all shipments of forest products in their raw state is prohibited from gypsy moth infested area to points outside, unless such products are inspected.

The essential thing to look for is this egg mass, from late summer to May. The caterpillar which is large enough to be recognized through June and July varies from any others in the state by having a double row of red and blue spots down its back. There are six pairs of red spots and five pairs of blue, the latter nearest the head. Keep on the watch for this insect. It is dangerous, and its discovery should at once be reported.

The brown-tail moth feeds upon maple, but does not appear to be as extremely fond of its foliage as of that of the apple, pear and wild cherry. This insect at one time threatened to spread quickly over the entire state, but at present it is in a very reduced condition, and but a slight scattering is to be found in the towns along the Connecticut River. It is especially to be looked for during the winter when the little caterpillars, a hundred and fifty or two hundred in a group, are spun up in small webs or nests of leaves and gray silk on the tips of the branches. This latter fact offers the best means of control, clipping off and burning the nests. Watch should be kept for these and reported if found outside the first tier of towns along the New Hampshire line.

You are probably all familiar with the forest tent caterpillar, or maple tree worm which raged through the state about 1899 and 1900. I discussed this insect at some length previously. There is little that can be done in an artificial way against the pest in sugar places..

The fall canker worm sometimes gets extremely plentiful among the maples. It is an inch worm which feeds during late May and early June and then goes into the ground to emerge in the adult stage in the fall, hence the name. The females are wingless moths which have to crawl up the trees to deposit eggs. Sticky bands applied by the middle of October serve as good protection by catching these moths.

There are numerous other species of inch worms attacking the foliage, such as the Notch wing, the Linden moth and the Saw wing. These are all savory morsels for birds.

Other foliage eaters of lesser importance are the great cecropia moth, the polyphemus moth, and the rosy dryocampa, which has been, in some parts of the country, a decided pest upon maples.

These are all bad in their way, but some of the most severe damage to maples is not caused by attacks on foliage but upon the bark and sapwood by borers. Everyone who knows maples has seen the characteristic work of the sugar maple borer. Usually the apparent damage, however, is less important than that which is going on unseen within the tree, for it is not for several years after the work is done that the bark comes off over the wound so that the dried wood is to be seen with the little grooves or burrows within it. The adult of the sugar maple borer is a large, black beetle, fantastically marked with yellow stripes. She deposits eggs in the fresh bark during the summer, tiny

grubs hatch and work their way through the bark and into the sap wood. They require two years to complete their life cycle, so that the grub has a long period in which to damage the tree.

Comparatively few trees are killed outright by these borers, but a high percentage are badly weakened and rendered susceptible to other attacks. Occasionally two borers make galleries close together on one trunk so that the tree is completely girdled. Generally this borer works on the lower parts of a tree, often just at the base of the larger branches which probably accounts for so many fallen limbs among maples.

Now besides giving the woodpeckers every possible show there is little to be done against this species except cutting out with a sharp knife such of the borers as can be located and reached and removing superfluous or weakened trees. It has been said that leaving undergrowth lessens their attack, but this is questionable.

Another less prevalent, but interesting borer is called the pigeon tremex or horntail. This is a very pretty member of the wasp order, which insect it somewhat resembles except that it is larger and its waist measure more nearly conforms to the present style. It inserts its eggs in the tree, usually on the main trunk, and the larvae which hatch work in the sap wood, that is if they are given a show, for it often happens that after they have started their burrows along comes a lady of a different type who proceeds to deposit her own eggs in the tremex burrow and the ensuing larvae feed upon the borers till the latter are killed. This parasite is known as the lunate longsting. It is a peculiar looking insect and may often be found on maples along city streets, for these, growing under unfavorable conditions, are particularly infested by the horntails.

The larvae of a little clear wing moth known as the maple sesia also bore in maples, and there are numerous other species of lesser importance. Most of the borers flourish in trees already weakened by other agencies and some work in dead wood only. The philosophy of removing such trees is obvious as well as the necessity of giving trees as favorable growing conditions as possible. It would appear that in the case of a thrifty well growing tree the favorable conditions just overbalance the unfavorable ones, and let the ravages on its foliage or in its wood from any one kind of insect become unusually heavy and the balance may be thrown the other way.

These are the principal insect enemies of the maple, so far as they have come to my knowledge. If there are any questions I shall be glad to try to answer them.

MR. ORMSBEE:—Do not the larvae of the lunate long-sting become borers themselves after having fed upon the larvae of the horn-tails? And, if so, do they not work an injury to the tree?

MR. BAILEY:—Yes, to both questions. But they bore directly to the surface, and so the injury is much less than that which would naturally be made by the true borer.

LIST OF INSECT INJURIOUS TO MAPLES.

(NOTE:—In preparing this list I have been assisted by the use of Felt's *Insects Affecting Park and Woodland Trees* to which reference may be had for further information concerning most of the species mentioned herein.

In some cases I have noted other references which are of much value concerning some of the more important species. I have given first place, alphabetically, to the common English names of species having such designations. Many of the less important kinds are known only by the scientific terms.)

BORERS.

Acamptus rigidus. Lec.
 Ants, white, (*Termes flavipes* Kollar.)
 Apple wood stainer (*Monarthrum mali*, Fitch.)
Bellamira scalaris Say.
 Buprestid, banded, (*Buprestis fasciata* Fabr.)
 Buprestid, divaricated (*Dicera divaricata* Say.)
 Carpenter worm (*Prionoxystus robiniae* Peck.)
Cerylon castaneum Say.
Chalcophora campestris Say.
Colastus truncatus Rand.
Cratoparis lunatus Fabr.
Cryptarcha concinna Melsh.
Cryptorhynchus obtentus Hbst.
Cucujus clavipes Fabr.
Dendroides canadensis Latr.
Dendroides concola Newm.
Dicera pugnata Germ.
Dryobius sexfasciatus Say.
Elatar humeralis Lec.
Elater nigricollis Herbst.

- Flat headed borer (*Chrysobothris femorata* Febr.)
 Forked fungous beetle (*Boletotherus bifurcus* Fabr.)
 Ghost moth, silver spotted, (*Stenopsis agenteomaculatus* Harr.)
Gonotropis gibbosus Lec.
Hister lecontei. Mars.
Hoplocephala bicornis Oliv.
Hyperplatys maculatus Hald.
Laemophloeus biguttatus Say.
Laemophloeus testaceus Fabr.
Leptura proxima Say.
 Leopard Moth (*Zezura pyrina* Fab.) U. S. Dept. Agri.
 Farmers' Bul. 708.
Leptostylus aculiferus Say.
Liopus variegatus Hald.
 Maple sesian (*Sesia acerni* Clem.)
 Maple and Oak twig pruner (*Elaphidion villosum* Fabr.).
Melandrya striata Say.
Mordella borealis Lec.
Oryssus sayi Westw.
Oryssus terminalis Newm.
Phloeotrya liturata Lec.
Phloeotrya simulata Newm.
 Pigeon tremex (*Tremex columba* Linn.)
Platypus compositus Say.
Protecteras aesculenum, Riley.
Purpuricenus humeralis Fabr.
Pyrochroa femoralis Lec.
 Red horned borer, small, (*Ptilinus ruficornis* Say.)
 Rustic borer (*Xylotrechus colonus* Fabr.)
Sesia corni, Hy. Edw.
Silvanus imbellis Lec.
 Stalk borer (*Papaipema nitela* Guen.)
Stenocelis brevis Bohn.
 Sugar maple borer (*Plagionotus speciosus* Say.)
Synchroa punctata Newm.
Uliota dubius Fabr.
Urographis fasciatus DeGeer.
 White horned maple borer (*Xyphidria albicornis* Harr.)
Xylocleptes, sp.
Xyloterus politus Say.

LEAF FEEDERS.

- American dagger moth (*Apatela americana* Harr.)
 American lappet moth (*Phyllodesma americana*.)

- Anagoga pulveraria* Linn.
Apatela impleta Walk.
Apatela retardata Walk.
Azelina ancetaria Hubn.
 Bag or basket worm (*Thyridopteryx ephemeraeformis* Haworth.)
 Brown-tail moth (*Euproctis chrysorrhoea* Linn.) Vt. Dept. Agri. Cir. No. 1.
 Canker worm, fall, (*Alsophila pometaria* Harr.)
 Cecropia moth, (*Samia cecropia* Linn.)
Cenopsis reticulatana Clem.)
Chrysomela bigsbyana Kirby.
Cleora pampinaria Guen.
Cyaniris ladon Cram.
Demas propinquinella, Grote.
Ectropis crepuscularia (Dennis & Schiff.)
 Elm saw-fly (*Cimbex americana* Leach.)
Ennomos subsignarius Hubn.
Eulia velutinana Walk.
Eutrapela alciphearis Walk.
Eutrapela kentaria Grote.
 Filament bearer (*ania limbata* Haw.)
 Forest Tent Caterpillar (*Malacosoma disstria* Hubn.) Vt. Agri. Exp. Sta. Bulletin 76.
 Gypsy moth (*Porthetria dispar* Linn.) U. S. Dept. Agri. Farmers' Bul. 564.
Gracilaria alchimiella Scop.
 Hag moth (*Photeron pithecia* Abb & Smith.)
Heterocampa biundata Walk.
Heterocampa subrotata Haw.
Heterophleps triguttaria H. S.
 Imperial Mota, (*Basilona imperialis* Drury.)
 Io moth (*Automeris io* Fabr.)
 Leaf roller, red banded (*Eulia triferana* Walk.)
 Leaf roller, V marked (*Archips argyrospila* Walk.)
Lithocolletes aceriella Clem.
Lithocolletes clemensella Chamb.
Lithocolletes lucidicostella Clem.
 Maple leaf cutter, (*Incurvaria acerifoliella* Fitch.)
 Maple leaf stalk borer (*Epinotia claypoleana* Riley.)
 Maple spanworm, large (*Sabulodes transversata* Dru.)
 Dru.)
 Maple trumpet skeetonizer (*Thiodia signatana* Clem.)
 Maple worm, green striped, (*Anisota rubicunda* Fabr.)
 U. S. Bur. Ent. Cir. 110.
 Maple worm, semilooper, (*Homoptera lunata* Drury.)
Morrisonia confusa Hubn.

- Notch wing, (*Ennomos magnarius* Guen.)
 Oak caterpillar, green, (*Nadata gibbosa* Abb & Smith.)
 Oak caterpillar, red humped (*Symmerista albifrons* Abb & Smith.)
Opheroptera boreata Hubn.
Pandemis lamprosana Rob.
Phigalia titea Cram.
Philosamia cynthia Drury.
Platycerus quercus Web.
Platynota flavendana Clem.
 Polyphemus moth (*Telea polyphemus* Cram.)
Priocycla armataria (H. S.)
Prolimacodes scapha Harr.
 Prometheus moth, (*Callosamia promethea* Dru.)
Pyrophila pyramidoides Guen.
 Saddled prominent, (*Heterocampa guttivitta* Walk.)
 Saw wing (*Euchlaena serrata* Dru.)
Schizura ipomoeae Dbldy.
Schizura semirufescens Walk.
Sisyrosea inornata Gr. & Rob.
Sisyrosea texula H.-S.
Sisyrosea textula H.-S.
 Tussock moth, white marked, (*Hemerocampa leucostigma* Abb & Smith.)
 Two lined parallelia (*Parellelia bistracaris*)
 Velleda lappet moth (*Tolyte velleda* Stoll.)
Xylina antennata Walk.

LEAF MUTILATORS.

- Cecidomyia aceris* Shim.
Megachile optiva Cress.

SCALE INSECTS.

- Black banded scale (*Eulecanium nigrofasciatum* Perg.)
 Cottony maple scale (*Innumerabilis pulvinaria* Rathv.)
 U. S. Bur. Ent. Cir. 64.
 English walnut scale (*Aspidiotus juglans-regiae* Comst.)
 Gloomy scale (*Aspidiotus tenebricosus* Comst.)
 Hemlock scale (*Aspidiotus abietis* Schr.)
 Maple leaf scale (*Pulvinaria acericola* Walsh & Riley.)
 Oyster shell scale, (*Lepidosaphes Ulmi* Linn.) U. S. Bur. of Ent. Circular 121.
 Oleanda scale (*Aspidiotus nerri* Bouche.)

Pseudococcus aceris Geoffry.
Putnam's scale (*Aspidiotus ancylus* Putn.)
San Jose scale, *Aspidiotus perniciosus* Comst. U. S.
Dept. Agri., Farmers' Bul. 650.

APHIS, OR PLANT LICE.

Chaitophorus aceris Linn.
Maple phenacoccus (*Phenacoccus acericola* King.)
Painted maple aphid (*Drepanosiphum acerifolii* Thos.)
Woolly maple leaf aphid (*Pemphigus acerifolii* Riley.)

GALL INSECTS.

Maple bladder gall (*Eriophes quaripes* Shimer.)
Maple fulsiform gall (*Eriophyes acricola* Garm.)
Maple leaf gall, ocellate, (*Cecidomyia ocellaris* Osten
Sacken.)

INSECTS OTHERWISE INJURIOUS.

Buffalo tree hopper (*Ceresa bubalus* Fabr.)
Dog day cicada (*Tibicen tibicen* Linn.)

FRIDAY AFTERNOON.

PRES. CHAPIN:—The first thing on our program this afternoon is the report of the judges of the Maple Sugar Makers' Association, which the secretary will read. The judges appointed were Mr. Osgood of Rutland, Mr. Goddard of Waterloo, Canada, and Mrs. John B. Chase of Lyndon.

MR. ORMSBEE:—I received two letters from exhibitors, —one from a lady and the other from a gentleman,—each asking if the exhibits would stand an equal chance if the owners were not present, and intimating, that, in past years, the judges had favored certain exhibitors. I want to say, in this connection, that every exhibitor's name is entered in this book, from which I shall read, and every exhibitor was given a number, which is recorded here with his name. These respective numbers were attached to the exhibits, and formed the only means that the judges had for distinguishing the different exhibits. This book has not been out of my possession since the exhibits began to be placed in position, and not one of the judges has, even now, the slightest intimation of the ownership of a single exhibit

on the table. And this practice was adopted more than twenty years ago. So the charge of partiality or outside influence cannot hold.

The density, or body, was ascertained by means of a hydrometer borrowed from the Experiment Station. A sample from each can was poured into a little glass vial, and placed in the window, and compared with others to ascertain the color. Regarding the flavor we were obliged to accept the opinions of the judges. But if any person feels himself agrieved, we shall be glad if he will come forward and the judges will go over the case with him.

Following is the list of premiums:—

PREMIUMS AWARDED.

SWEEPSTAKES CUP.

J. P. Spear.....West Newbury

CLASS A.

LARGEST AND BEST DISPLAY OF MAPLE PRODUCTS.

Premium.

1st C. H. Colvin, Rutland.....\$25.00

CLASS B.

BEST ARTISTIC DISPLAY OF MAPLE PRODUCTS. ..

1st J. P. Spear, West Newbury.....\$25.00

CLASS C.

CAKE SUGAR.

BEST MAPLE SUGAR CAKES NOT LESS THAN FIVE POUNDS.

	No. of Points.	Pre- mium.
1st Mrs. C. H. Colvin, Rutland.....	93½	
2nd N. E. Colvin, Danby	93½	
3rd Alvin Smith, Danby	93	
4th H. W. Shattuck, Eden.....	96	\$2.00
5th Martin Prindle, St. Albans.....	92½	
6th Lewis M. Walker, West Rutland.....	97	4.00
7th Mrs. Edward O. Newell, W. Wardsboro..	96½	3.00
8th D. E. Giddings, E. Fairfield.....	95½	1.00

CLASS D.

BEST EXHIBIT OF MAPLE CREAM, NOT LESS THAN FIVE PACKAGES.

1st Mrs. C. |A. Badger, E. Montpelier.....	96½	\$4.00
2nd L. L. Story, E. Fairfield.....	95	3.00

CLASS E.

MAPLE SYRUP, SINGLE GALLON, IN GLASS OR TIN.

Premium paid pro rata per point on all samples scoring 91 or over.

	Score.
Mrs. C. H. Colvin, Rutland.....	96
H. B. Chapin, Middlesex.....	96
N. E. Colvin, Danby.....	95
Dolphus Perry, Fairfield.....	97
Alvin Smith, Danby.....	95½
G. A. Gould, Danby.....	94½
A. W. Gillilan, Cambridge.....	95½
R. M. Bromley, Danby.....	96
DeLos B. Bromley, Danby.....	95
Martin Bromley, Danby.....	95½
Duane P. Bromley, Danby.....	95
Mrs. Nancie Bromley, Danby.....	95
Matt H. Bromley, Danby.....	95½
P. B. B. Northrop, Sheldon.....	94
Miss Hazel Marcette, E. Fairfield.....	94
Joseph A. Marcette, E. Fairfield.....	95½
Mrs. Zoe B. Marcette, E. Fairfield.....	96
Eli Marcette, E. Fairfield.....	96
E. E. Perley, Richford.....	95½
A. R. Magoon & Son, Newport.....	96½
A. F. Coville, Andover.....	96
M. E. Lamson, Montpelier.....	96½
C. A. Badger, E. Montpelier.....	94½
L. E. Cook, Cambridge.....	95½
A. Salmon & Son, West Glover.....	95½
G. H. Soule, Fairfield.....	96
Frank Teer, Clarendon Springs.....	95½
R. H. Marony, Clarendon Springs.....	95½
F. F. Spear, W. Newbury.....	93½
C. L. Spear, W. Newbury.....	93½
R. N. Spear, W. Newbury.....	93½
W. H. Collins, Strafford.....	96
C. W. Collins, Strafford.....	96
Mary E. Collins, Strafford.....	96
Martin Prindle, St. Albans.....	93½
Guy Prindle, St. Albans.....	93½
Corbett Bros., W. Brattleboro.....	95
Enos. R. White, Brattleboro.....	95
E. B. Corbett, W. Brattleboro.....	95
Joseph Gravelin, Newport.....	95½

Edward Gravelin, Newport	96
C. E. Martin, Rochester	96
K. F. Hewes, S. Londonderry	93
Mrs. Edward O. Newell, W. Wardsboro.....	96½
H. J. Hewitt, Bristol	95½
D. E. Giddings, E. Fairfield	96

CLASS F.

MAPLE SUGAR IN 10-POUND PAIL OR TUB.

Premium paid pro rata per point on all exhibits Scoring 91 or Higher.

Guy Prindle, St. Albans	94½
Martin Prindle, St. Albans	94
E. E. Perley, Richford	97½
A. & N. K. Salmon, W. Glover	95½
Mrs. C. H. Colvin, Rutland	98
L. E. Cook, Cambridge	92
N. A. Colvin, Danby	96
Eli Marcett, E. Fairfield	94
R. P. Shattuck, Eden	97
M. G. Lamson, Montpelier	93½
Mrs. Edward O. Newell, W. Wardsboro.....	97½
D. E. Giddings, E. Fairfield	95½

PRES. CHAPIN:—One of our judges, Mr. Goddard, has a few words to say to us.

MR. GODDARD:—It is not that I have so much to say about the sugar as it is that it was my pleasure to score your sugar at Brattleboro two years ago. As you know, the score is on the flavor, packing, grain, and density of the syrup. Down there there was a lot of packages that were hard and these were put on the table for the judges, and it was brought up in the meeting. I want to say that I find a great improvement in the packages on these tables to what they were two years ago. Down there at Brattleboro there were a few rusty cans, and today there are only a few here. I just wish to tell you that you should be very particular about that. I never have scored or judged a lot of maple sugar or syrup that is so even and as good as there is on that table right there.

MR. ORMSBEE:—I want to say in supplementing that that there were several cans filled up with syrup out of the same batch, and they got different scorings because there was rust on some of the cans.

DISCUSSION OF SCORE CARDS FOR JUDGING MAPLE PRODUCTS.

MR. ORMSBEE:—We have brought in here this discussion of score cards because the sugar makers have not any adopted standard by which to judge sugar. We commenced way back in the very early history of the Maple Sugar Makers' Association and held a meeting in Montpelier twenty-three years ago. G. H. Grimm was the chief man in the whole business at that time. He had offered to give \$25 to any person who would produce better syrup than could be produced in the Grimm evaporator, and a Montpelier man brought in some that was better, which was manufactured in the old fashioned pan. Mr. Grimm ruled that the color for syrup should be a straw color rather inclined to dark, and that scored Mr. Templeton out because his syrup was too light. Now the score card has been changed a great many times during the past few years. The score card that we have now for syrup is: flavor 60%; body 20%; color 15%; package 5%.

Is that the best card and best proportion that we can get? Would it be better to reduce the flavor and add that to the body or color? Flavor counts the highest. Is that the best?

PROF. JONES:—I have had some experience in judging maple products, and while it is nothing to me what figures you adopt for flavor, body, color and package, yet it has always seemed to me that color is not given sufficient prominence. Give it fifteen points. Density should be considered, in making up a score card, as a definite factor, and the score perfect. You measure that and it is not a question as to what you think, or I think, as to flavor. When you use those little bottles the color comes on that same basis. Anybody would take those bottles you had in those windows and grade exactly as the judges did. So that is an exact feature, and lightness is directly in proportion to the high standard you are aiming for. I think flavor and color should make a total of 75 points. Whenever I have scored in other localities I have not had to score the package, but put the body at ten and divide, 50 and 40. We have nine or ten light colored things and they are number one syrup,

commercially, but supposing the maximum was 30, and score them down one-tenth. That is just a personal idea of my own. Color is always closely associated with flavor; there is a correlation between them. The lighter the color, the better the flavor, and why give flavor 60 and color 15? A man who has a light colored syrup will have a pretty good showing if the color is put up a few more points. The density and color are facts. Score them as you see fit and you can make a scale.

MR. ORMSBEE:—I want some standard adopted by the Association and not have everything left to the individual opinions of the judges, which will vary from year to year and with different sets of judges. The next thing is the package. Ought that to come in here in this manner?

PROF. JONES:—I think so.

MR. ORMSBEE:—The package would be a necessary factor if the premium list called for syrup or sugar put up for market, but, in the present instance it calls merely for the product in the abstract, without regard to package. At the same time the Association wants the exhibits to present the most attractive appearance possible, and, under this consideration the package should be given a high rating. So, I favor giving flavor 50 points, color 40, density 10. That makes 100 points, and then deduct points from the final score according to the opinion of the judges.

PROF. JONES:—I think the combination is a good one, and I want to go on record as favoring it. But if you have several samples that score exactly the same, so far as the syrup is concerned you have got to look further, and here is where the package is taken into consideration.

MR. ORMSBEE:—Not under the pro rata system of awarding premiums. We look for the actual scoring, and not for the package which scores the highest.

MEMBER:—What about the packages that are damaged in transit?

MR. ORMSBEE:—Samples should be so packed that there will be no damage during transit, but they are not always so packed, and we make allowances for such defacements.

And now in regard to maple sugar. The score card, at present reads, flavor 60, grain 15, color 15, and package 10. Does that meet your approval? Why should package read 10 with sugar and only 5 in the matter of syrup?

PROF. JONES:—Why not leave it the same as with syrup, 50, 40, 10? Substituting the term grain for density.

MR. SHATTUCK:—I wish there could be something said in regard to what would be a proper grain for pail sugar, as well as for cake sugar and cream. It may vary according to the tastes of different people, but it seems to me it would be quite a good thing for the sugar makers of the state to know about what grain to work for in those things. Pail sugar grades as coarse, medium or fine, and the same with the cakes. I should like to know myself. You take these sugars here and you can see a big difference made in the grain. That is not in the sugar but in the stirring it, and you can make most any sugar several colors lighter by simply the extra work of stirring it. To what point shall we bring it?

MR. GODDARD:—Although not a sugar maker in Vermont I have been an exhibitor in Canada for thirty years, and I would like to just tell my experience. When I first started I went a number of years before I was able to take a prize. My home is near Sherbrook where the best maple sugar and syrup in Canada is made, but the largest exhibits generally went to Ottawa, the largest exhibitors sometimes taking as much as two tons for one exhibit. We were really obliged to put the syrup up in glass, which is the only way for exhibition purposes, I think. There is a little more shrinkage and loss and a little more express to pay, but it is nicer in a package of this kind, and you will find out next spring you can buy glass cheaper than tin containers, and I think you would be wise to make a change there.

Personally I don't want too much grain, and for pail sugar I want less than for cake sugar, but the next man may not agree with me. For years up there in Canada the judges didn't agree. The new generation coming up rather eat maple cream without any grain in it than they would maple sugar, because they want it smooth. I exhibited for five years and never took a prize. The judges, at that time, were people who were in the old ruts, and wanted the sugar black, and wanted that strong "maple flavor", and I was trying to produce a sugar that was far superior in both appearance and color and flavor. I might add that I didn't make much headway until we got one or two judges from Vermont to judge our exhibits, and they knew their business. You cannot get your sugar any too white if you have the flavor.

MR. ORMSBEE:—I move that the chair appoint a committee of three to discuss this matter among themselves, decide upon a standard of grain and other factors, and also to formulate an exact score card to be used until it is changed by vote of the Association.

PROF. JONES:—I second that motion and think it is a good idea to have this done tentatively. That is, select a score card and try it out, and, if it proves satisfactory, bring it before the Association and have it adopted.

Vote taken and carried, and the President appointed as such committee Prof. Jones, Mr. Shattuck and V. I. Spear.

PRESIDENT CHAPIN:—Is there other business to come before the Association at this time?

MR. ORMSBEE:—This completes the programme, and it concludes all matters of business that have come to my knowledge. We have already encroached upon the time allotted to the Horticultural Association, and I think an adjournment is now in order. Should other matters arise, there will be a few minutes of spare time this evening during which we can discuss them.

PRESIDENT CHAPIN:—The chair takes it that this is the sense of the Association, and, thanking you all for your attendance and attention, and for the many courtesies extended, the meeting now stands adjourned till further notice.

HONORARY MEMBERS VERMONT MAPLE SUGAR MAKERS' ASSOCIATION.

Page, Hon. Carroll S., Washington, D. C.	Minahan, Dr. R. E., Green Bay, Wis.
Dillingham, Hon. William P., Washington, D. C.	Sevey, C. G., Editor New England Homestead, ..Springfield, Mass.
Greene, Hon. Frank L., Washington, D. C.	Vail, Hon. Homer W., Randolph, Vt.
Dale, Hon. Porter H., Washington, D. C.	

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 Cambridge, Vt.
 Wright, Arthur,
 R. F. 2, Bradford, Vt.
 Wright, W. J.,
 Montgomery Ctr., Vt.
 Wright, Carlos & Son,
 Bradford, Vt.
 Wyman, Ned W., Cambridge, Vt.
 White, Enos R., West Rutland, Vt.

Y

York, William E.,
 R. F. D. 4, Bristol, Vt.
 Young, J.,
 R. F. D. 4, Orleans, Vt.

